

No. 5.— *The Gosibiidae of America North of Mexico.*

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THE genera included in the family Gosibiidae occur in Mexico and across the southern portion of the United States. Nearly all of the lithobioid chilopods thus far reported from Mexico, in fact, appear to belong here. When Mexico shall have been well explored, there is little doubt that the family will be found to be a large one. From the southwest it has spread in the United States northward to north central California and to Colorado and northeastward to Tennessee and North Carolina.

LITHOBIOIDEA Chamberlin.

Bull. M. C. Z., 1915, 59, p. 531.

Erected in contrast with the new superfamily Henicopoidea to include the Lithobiidae proper, Watobiidae, Ethopolidae (Ethopolys, Bothropolys and allies), and Gosibiidae.

GOSIBIIDAE Chamberlin.

Bull. M. C. Z., 1915, 59, p. 531.

The members of this family have the claw of the female gonopods always large and strictly entire, with never any trace of teeth or partite condition, any element giving such trend or expression being apparently wholly absent. First article of gonopods broad, protruding well mesad, with mesal edge usually strongly chitinized and either conspicuously and characteristically excavated at base or there curving more evenly but distinctly ectad; the excavation commonly the deeper continuation of a transverse furrow or constriction extending across the proximal end of the article. Basal spines large and stout, the article beneath them compressed more or less to a thin

edge which is typically well chitinized. Spines of each gonopod nearly always in a plane, and subparallel with or making but a small angle with the principal plane of the gonopod (*i. e.* the one including the axis and the greatest diameter of the first article), and thus making a distinct angle with that of the spines of the other gonopod (*i. e.*, when seen in caudal view the two rows of spines usually meet at a distinct angle instead of lying in the same horizontal plane as in the Lithobiidae).

In the males either the penult or the anal or, much more commonly in ours, both the penult and anal legs showing conspicuous special lobes or modifications, the penult being more constantly and usually more conspicuously modified than the anal.

Excepting in the subgenus *Guambius*, the dorsal spines of the penult legs are 1, 0, 3, 2, 2 or 1, 0, 3, 2, 1, those of the anal legs also, with rare exceptions, being the same.

In mouthparts, eyes, general structure of prehensors, and prehensorial segment, and in most other general structural features, agreeing with the Lithobiidae proper.

Key to Genera.

- a. Coxae of last five pairs of legs bearing pores.
Pseudolithobius Stuxberg.
- aa. Coxae of only the last four pairs of legs bearing pores.
 - b. Prosternal spines very stout, exceeding the teeth in size; articles of antennae normally twenty.
Arenobius Chamberlin.
 - bb. Prosternal spines small and mostly bristle-like, at least distally, always more slender than the teeth; articles of antennae twenty-one to thirty-five, mostly above twenty-four.
 - c. Penult legs of ♂ having fifth article more or less obliquely depressed or excavated above at distal end and there bearing at very end a conspicuous lobe or crest. (Claws of anal legs two or three; species 10–15.5 mm. long).
Guambius Chamberlin.
 - cc. Penult legs of ♂ with fifth article thickening distad, but never excavated above nor bearing at end any such crest. (Claws of anal leg one or two; species 15–30 mm. long).
Gosibius Chamberlin.

GOSIBIUS Chamberlin.

Can. ent., 1912, **43**, p. 204; Ann. Ent. soc. Amer., 1912, **5**, p. 146.

Lateral marginal breaks of head distinct.

Antennae from short to long, mostly moderately long; articles twenty-one to thirty-five, nearly always above twenty-four.

Eyes composed of ocelli in several series. Single ocellus distinctly largest.

Prosternal teeth $2 + 2$ or, less commonly, $3 + 3$. Line of apices recurved. Sinus large; between V- and U-shaped. Ectal spines much more slender than the teeth, usually, but not always, distally bristle-like.

Body moderately narrowed cephalad, distinctly less so than, *e. g.*, in *Arenobius*. First dorsal plate nearly always as wide as or wider than the third. Posterior angles of none, of ninth, eleventh, and thirteenth, or of the sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced.

Coxal pores circular, uniseriate; present on last four pairs of coxae.

In the male the penult legs have the fifth joint distinctly elevated distally and thus there manifestly thicker than proximally, with or without a nodular protuberance on the elevated portion but this never at the very distal end and never cristate. While rarely essentially unmodified, the anal legs usually have the fourth joint distinctly longitudinally furrowed above and widened, and in some the fifth also more or less widened and bowed ventrad, the joint along side of furrows more densely pilose. Dorsal spines of anal legs mostly 1, 0, 3, 2, 1 or 1, 0, 3, 2, 2, more rarely 1, 0, 3, 2, 0 or even 1, 0, 3, 1, 0; ventral spines 0, 1, 3, 3 (2), 1 or 0, 1, 3, 3, 2; claws one or two. Dorsal spines of penult legs 1, 0, 3, 2, 2, rarely 0, 0, 3, 2, 2; ventral 0, 1, 3, 3, 2 or 0, 1, 3, 3, 3 or very rarely only 0, 1, 3, 3, 1. Dorsal spines of fourth to thirteenth legs, and usually of second and third as well, 0, 0, 3, 2, 2; of first legs either likewise 0, 0, 3, 2, 2 or 0, 0, 2, 2, 1 to 0, 0, 2, 1, 1. Some of the posterior coxae dorsally armed; and either none or from last one to four pairs laterally armed.

Gonopods of male uniarticulate.

Claw of female gonopods large and entire as usual. Basal spines $2 + 2$ or $3 + 3$. First article large, protruding mesad over base, with the inner side strongly chitinated and usually appearing conspicuously excavated proximally, commonly distinctly constricted or furrowed across base.

Species from 15 to 30 mm. in length.

TYPE.—*G. paucidens* (Wood).

The species of this genus so far as known from our region are confined to the extreme southwestern United States; *i. e.* to Arizona and California (Figure 1).

The genus is close to *Guambius*; but it differs, *e. g.*, conspicuously and constantly in the character of the modification in the penult legs, as also in most cases equally clearly in that of the anal legs of the male.

Key to Subgenera and Species of Gosibius.

- a. Posterior angles of none of the dorsal plates produced.
 - Abatobius*, subgen. nov.
 - b. Claw of anal legs single; fifth joint of first thirteen pairs of legs with three ventral spines; dorsal spines of anal legs 1, 0, 3, 1, 0. *G. arizonensis*, sp. nov.
 - bb. Anal legs with two claws; fifth joint of none of the legs with three ventral spines; dorsal spines of anal legs 1, 0, 3, 2, 0.
 - G. montreus*, sp. nov.
 - aa. Posterior angles of ninth, eleventh, and thirteen dorsal plates produced. *Gosibius*, sens. str.
 - b. Anal legs with two claws; basal spines of ♀ gonopods 2 + 2.
 - c. Ventral spines of anal legs 0, 1, 3, 3, 1.
 - G. monicus* Chamberlin.
 - cc. Ventral spines of anal legs 0, 1, 3, 3, 2; tibia of first and second legs with 2 dorsal spines. *G. claremontus*, sp. nov.
 - bb. Anal legs with but one claw (Basal spines of ♀ gonopods normally 3 + 3, rarely 2 + 2).
 - c. Ventral spines of anal legs 0, 1, 3, 3, 2; articles of antennae twenty-eight to thirty-five. *G. paucidens* (Wood).
 - ce. Ventral spines of anal legs 0, 1, 3, 2, 1 or 0, 1, 3, 3, 1; articles of antennae twenty-one to twenty-three.
 - G. brevicornis*, sp. nov.
 - aaa. Posterior angles of sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced. *Timiobius*, subgen. nov.
 - Anal legs with two claws. *G. intermedius*, sp. nov.

Fig. 1. Distribution of *Gosibius*.

GOSIBIUS (GOSIBIUS) PAUCIDENS (Wood).

Plate 1, fig. 1-4.

Lithobius paucidens Wood, Journ. Acad. nat. sci. Phil., n. s., 1862, **5**, p. 14;Trans. Amer. phil. soc., n. s., 1865, **13**, p. 151.*Lithobius paucidens* Stuxberg, Öfver. K. vet.-akad. Förh., 1875, p. 12; Proc.Cal. acad. sci., 1877, **7**, p. 137.*Lithobius paucidens* Chamberlin, Ann. Ent. soc. Amer., 1909, **2**, p. 191; Po-mona college Journ. ent., 1910, **2**, p. 372.*Gosibius paucidens* Chamberlin, Can. ent., 1912, **43**, p. 204.

DIAGNOSIS.—Dark brown with a darker median dorsal stripe; head and first and last tergites orange or ferruginous. Antennae long; articles twenty-eight to thirty-five. Ocelli fourteen to twenty in four or five series. Prosternal teeth 2 + 2. First dorsal plate wider than third. Posterior angles of ninth, eleventh, and thirteenth dorsal plates produced. Basal spines of female gonopods 3 + 3, or rarely 2 + 2. Dorsal spines of from last seven to last ten pairs of legs 1, 0, 3, 2, 2; of the others, 0, 0, 3, 2, 2. Anal legs with claw single; ventral spines 0, 1, 3, 3, 2; dorsal 1, 0, 3, 2, 2. Ventral spines of twelfth and thirteenth legs 0, 1, 3, 3, 3; of seventh to eleventh 0, 0, 3, 3, 3; of others 0, 0, 2, 3, 3. Trochanter of last four pairs of legs armed. Anal legs of male with fourth joint widened, complanate, and longitudinally furrowed above (Plate 1, fig. 3). Penult legs of male with fifth joint elevated distad (Plate 1, fig. 4). Length 18-30 mm.

DESCRIPTION.—Dorsum testaceous to dark brown and subferruginous, usually with a dark median longitudinal stripe which is often black and rather wide, sometimes embracing most of width of dorsum, the dark color becoming more dilute ectad. Head orange or ferruginous, with the first and the last dorsal plate usually of similar color but this paler or more dilute, though sometimes these plates scarcely differ from the rest of the dorsum; the dark median stripe of dorsum often extending upon head. Antennae like head or nearly so. Venter yellow to testaceous and almost clear brown, the last 3 or 4 plates darker, commonly of orange or ferruginous cast. Prosternum and prehensors orange to ferruginous. Legs yellow to testaceous; the caudal pairs a little darker than others, uniform.

Body mostly near 7.75 times longer than width of tenth plate. Only moderately narrowed cephalad to first plate which is wider

than the third but much narrower than the head. Width of head and of first, third, eighth, and tenth plates to each other (in ♀) as 69 : 63 : 62 : 69 : 72.

Head broadly subcordate; the sides caudal of marginal breaks moderately converging, the caudal corners well rounded and the caudal margin mesally incurved. Considerably wider than long (7:6 or nearly so). Appearing smooth and shining, being only obscurely roughened and with the punctae fine. A rather deep sulcus, this usually angular and often pit-like at middle; sometimes a median longitudinal sulcus leading forward from it.

Antennae long, reaching mostly somewhere between beginning of eighth and end of ninth segment, varying considerably. Articles twenty-eight to thirty, all long and cylindric, usually more or less uniformly and gradually decreasing distad, occasionally those beyond the first 12-16 rather abruptly shorter. Hairs short.

Ocelli from fourteen to twenty in number, nearly always in four series but occasionally in five. The most frequent arrangement is 1 + 4, 4, 4, 3. Examples of other arrangements are: 1 + 4, 4, 3, 2; 1 + 4, 4, 3, 3; 1 + 4, 5, 5, 4; 1 + 4, 4, 4, 3, 1; 1 + 4, 4, 4, 3, 2. The single ocellus not contiguous with the others, much largest. Of the seriate ocelli those of most dorsal row are largest, often much differing among themselves, those of second row but little smaller or not at all so, those of lowest row considerably smallest as usual.

Prosternum 1.6 times wider than long. Anterior margin widely rounded. Teeth 2 + 2; small, well separated, but dental line as a whole relatively short; mesal tooth larger than the ectal, but its apex farther caudad and thus line of apices is recurved. Spine well ectad of outer tooth, long and slender but stouter than the bristles and also paler than the latter; springing from a rounded nodule. Distance between chitinous spots 4.66 times dental line; 1.75 times width at level of bottom of sinus.

Surface of first dorsal plate nearly like that of head, appearing smooth and shining, or only obscurely uneven. Other tergites more distinctly roughened, especially the more caudal ones; these usually showing the short, submarginal, transverse sulcus on each side at about beginning of caudal third of length and a second similar, but less deeply impressed, one at middle of length; usually more or less evident also is a longitudinal furrow extending somewhat mesad of caudad from anterior margin between median line and lateral margin and bending mesad near beginning of middle third of length to join, or nearly join, the corresponding one of the other side, sometimes a branch continuing farther caudad also evident.

Ventral plates appearing mostly smooth and shining; with the usual three longitudinal furrows, the lateral ones, however, absent or obscure on the last one or two.

Coxal pores circular or transversely a little elongate and broadly elliptic. A common number and arrangement is 5, 4, 4, 4. The twelfth coxa has practically always one more pore than the others which have typically uniformly the same number. Other numbers are: 4, 3, 3, 3; 6, 5, 5, 5; and 7, 6, 6, 6.

Spines of first to fifth legs, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of sixth, the same or, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of seventh and eighth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$ or, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of ninth to eleventh, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of twelfth to penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$, all with 3 claws; of the anal, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$, claw 1. Last 7 to 9 pairs of coxae laterally armed.

In the female the posterior legs are short and slender; the prefemur and femur of anal legs longitudinally furrowed above, the latter the more distinctly so; the corresponding articles in penult legs more indistinctly furrowed. In the male the posterior legs are also slender; but the femur in the anal pair is typically considerably crassate and wider than the other articles, dorsally complanate and longitudinally deeply furrowed, with numerous hairs along and each side of furrow (Plate 1, fig. 3). The penult legs in the male have the prefemur and especially the femur longitudinally dorsally furrowed, while the tibia is clavately swollen, being wider and especially conspicuously thicker dorsoventrally at the distal end (Plate 1, fig. 4). There is considerable variation in the conspicuousness of these modifications, which in some specimens are weak.

Gonopods of male distinctly exposed. The single article in ventral view appears truncate distally, in lateral view seem to be narrowed to an edge.

Claw of female gonopods as usual; long and acute, strongly curved. Basal spines 3 + 3, rarely only 2 + 2; margin along which attached thin, strongly chitinous, blackish. Inner edge strongly chitinized. First article conspicuously excavated within proximally; transversely furrowed or constricted across base¹ (Plate 1, fig. 2).

Length 18–30 mm. A female 20 mm. long has antennae 10 mm. long, anal leg 7.5 mm. long; and tenth dorsal plate 2.6 mm. wide.

Immaturus (♂).—Dorsum dilute testaceous to light brown. Head brown or paler, yellowish, the pigment denser than in dorsum of body.

¹ Several females from Claremont have a stout spine at distal end of second article of gonopod, on left side in all. I have never noted myself or seen record of such occurrence of a spine on this article in any other species of the Lithobioidea.

Antennae brown to yellow. Prosternum and prehensors like head. Venter pale yellow to dilute brown, in most strongly suffused with green. Legs pale yellow to dilute brown, nearly uniform.

Antennae varying considerably in length but mostly approaching the proportion of those of adult. Articles twenty-seven to thirty.

Ocelli 1 + 4, 4, 3; 1 + 4, 3, 2; 1 + 3, 4, 3, 1; 1 + 4, 4, 3, 1; 1 + 4, 3, 3, 2; 1 + 4, 4, 3, 2; proportioned nearly as in *maturus*.

Prosternum essentially as in *maturus*.

Coxal pores mostly 3, 2, 2, 2.

Spines of first legs, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2(3)}$; of second to fifth as in adult; of sixth and seventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of eighth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$ or $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of ninth, $\frac{1, 0, 3, 2, 2}{0, 0, 2, 3, 3}$ or $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of tenth to anal as in *maturus*. Last four pairs of coxae laterally armed.

Anal legs in male slender, the fourth article but little enlarged, and other modifications usually more weakly indicated but their expression somewhat variable.

Length 14.5–17 mm.

Agenitalis II. Greenish. Head dilute olivaceous with a tendency toward dull dilute orange in the frontal region; a dark spot caudad of the suture. Antennae brown, paler distad. Legs all pale, uniform.

Antennae short, reaching fifth or sixth segment. Articles twenty-six to twenty-eight, short ones intermingled with longer ones.

Ocelli 1 + 4, 4, 3; 1 + 4, 3, 2; 1 + 4, 4, 3, 1; 1 + 4, 3, 2, 1.

Prosternal teeth 2 + 2. Sinus and spines as in adult or nearly so. Sides of anterior portion a little less strongly convexly rounded.

Coxal pores 2, 1, 1, 1.

Spines of first legs, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 1}$; of the second, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 1}$; of the third and fourth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 3}$; of the fifth to ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the tenth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$ or $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the twelfth, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$; of the thirteenth and penult, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 1}$; of the anal, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 1, 1}$. Twelfth coxae armed laterally.

Anal glands degenerate.

Length of specimens described 11.5–14.5 mm. (Santa Barbara; March, 1910).

Female gonopods straight, pale. Either two or all three articles present; glabrous and with no indications of spines.

Agenitalis I.—Greenish, with caudal borders of most plates more brownish. Head and antennae yellowish brown, the greenish tinge being obscure. Legs pale, uniform.

Antennae wanting.

Ocelli 1 + 4, 3, 2. All pale, the anterior and ventral ones especially so. Single ocellus largest.

Prosternal teeth 2 + 2. Sinus apparently same as in adult or relatively a little narrower. Sides of anterior portion less convex and less extended laterad than in *maturus*.

Coxal pores 2, 1, 1, 1.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 3, 1}$; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 1}$; of the third, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 2}$; of the fourth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the fifth to eighth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the tenth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ or on one side $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the twelfth, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the thirteenth and penult, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$; of the anal, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 0}$. Twelfth coxae laterally armed.

Anal glands present.

Length of specimen described, 9.2 mm. (Santa Barbara, March, 1910).

Pullus IV (Larva quarta). A strong greenish tinge marking the other pigment, but in one specimen the more usual purplish tinge prevailed. Head lighter, in front of suture dilute dull orange, a dark spot just back of the suture. Antennae brown, lighter distad. Legs pale, uniform.

Antennae already with twenty-six to twenty-eight articles; shorter and longer ones occurring variously. Length variable.

Ocelli 1 + 1, 3, 3, 2; 1 + 1, 4, 4, 2; 1 + 4, 4, 2; 1 + 4, 3, 2. The single ocellus of top row in first two cases at anterior end of patch. Single ocellus largest.

Prosternal teeth 2 + 2. Sinus V-shaped but narrowly rounded at bottom. Sides of anterior portion less convex than in adult and less extended laterad of teeth.

Twelfth coxae each with single pore.

Last three pairs of legs present as pale slender buds in which the division into articles is indicated in surface view by pale transverse lines.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 1, 1}$ or $\frac{0, 0, 1, 2, 1}{0, 0, 1, 1, 1}$; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 1, 2, 1}$; of the third, $\frac{0, 0, 2, 2, 1}{0, 0, 1, 2, 2}$ or $\frac{0, 0, 2, 2, 1}{0, 0, 1, 2, 1}$; of the fourth, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 1(2)}$; of the fifth, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 2}$; of the sixth the same as fifth or $\frac{0, 0, 2, 2, 2}{0, 0, 1, 3, 2}$; of the seventh, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 2}$ or $\frac{0, 0, 3, 2, 2}{0, 0, 1, 2, 2}$; of the eighth the same as latter or $\frac{0, 0, 3, 2, 2}{0, 0, 1, 3, 3}$; of the ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 1, 2, 2}$ or $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the tenth, $\frac{0, 0, 3, 2, 2}{0, 0, 1, 3, 2}$ to $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the eleventh and twelfth, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$ to $\frac{0, 0, 2, 2, 2}{0, 0, 1, 1, 1}$.

Anal glands large and conspicuous.

Length 8.25–9.25 mm. (Santa Barbara, March, 1910).

TYPE LOCALITY.—California: Fort Tejon.

Also taken in California at San Bernardino, (M. C. Z., No. 557, 560); Los Angeles, (M. C. Z., No. 559, 569); Laurel Canyon, (M. C. Z., No. 567); Santa Monica, (M. C. Z., No. 573); Claremont, (M. C. Z., No. 554, 556, 558, 561, 563, 570, 576, 577); Santa Barbara, (M. C. Z., No. 562-566, 575).

A very common species in southern California.

GOSIBIUS (GOSIBIUS) BREVICORNIS, sp. nov.

Plate 2, fig. 1-4.

DIAGNOSIS.—Light to dark brown. Antennae short, with articles twenty-one to twenty-three. Ocelli nine to fourteen in three or four series. Prosternal teeth 3 + 3. First dorsal plate of same width as the third. Posterior angles of ninth, eleventh, and thirteenth dorsal plates produced. Basal spines of female gonopods 3 + 3. Anal leg with claw single; dorsal spines 1, 0, 3, 2, 1, ventral 0, 1, 3, 2, 1 or 0, 1, 3, 3, 1. Dorsal spines of ninth to penult legs 1, 0, 3, 2, 2; ventral spines of penult 0, 1, 3, 3, 1 (♂) or 0, 1, 3, 3, 2 (♀). Ventral spines of tenth to thirteenth legs 1, 0, 3, 3, 3; of second to eighth 0, 0, 3, 3, 3. Dorsal spines of third to eighth legs 0, 0, 3, 2, 2. None of coxae laterally armed. Last six pairs of trochanters armed. Anal legs of male with fourth and fifth articles strongly widened, the fifth bowed ventrad and both articles dorsally furrowed. (Plate 2, fig. 2). Fifth joint of penult legs of male elevated distad, bearing a rounded eminence at beginning of elevated region (Plate 2, fig. 4). Length 16 to 30 mm.

DESCRIPTION.—Dorsum light or testaceous brown to deep brown, the head either the same or, in lighter specimens with a tendency toward very dilute orange while in darkest specimens it and the first plate are darker, chestnut. Antennae like the head, *i. e.*, chestnut in specimens in full color either uniform or, in some, paler distad. Prosternum and prehensors like head. Venter from light yellowish brown to dark brown, the last plates darker as usual. Legs dilute yellow to pale brown, the posterior pairs in females and lighter males not darker than the others, but in darker ones of weak chestnut color.

In males body nearly parallel-sided from the tenth segment cephalad, strongly narrowed caudad of twelfth plate, first and third tergites of same width. In females first plate is narrower than the third, and

body narrower caudad from eighth plate which is of same width as seventh. In females widths of head and of first, third, seventh, eighth, tenth, and twelfth plates to each other as 46:45:47:50:50:47:43. In males, omitting the seventh plate, the relations are 66:67:67:73:73:70. Body rather slender, typically 9–9.3 times longer than width of eighth plate.

Head suborbicular, the caudal margin being typically convex, often considerably so, though sometimes varying to nearly straight. Marginal breaks weak, oblique. Head smooth excepting for several pairs of impressed dots between suture and caudal margin and two impressions in median line in front of suture. A little wider than long (66:65 to 46:45).

Antennae short, reaching only to the fourth or fifth segment. Strongly narrowed distad. Articles twenty-one to twenty-three; mostly proportionately long, but the seventh and eighth, and the fourteenth and fifteenth (or sometimes thirteenth and fourteenth) articles typically abruptly much shorter than adjacent ones.

Ocelli nine to fourteen in three or four series: *e. g.*, 1 + 4, 4, 3; 1 + 3, 3, 2; 1 + 5, 3, 3; 1 + 3, 4, 4, 2; 1 + 4, 4, 3, 2. Eye-patch very small in proportion to size of head, more toward ventral side of head than usual. Ocelli pale and inconspicuous. Single ocellus much largest, well separated. Other ocelli decreasing conspicuously cephalad and ventrad.

Prosternal teeth 3 + 3; moderately large, the median on each side largest, so that if most mesal one on each side were omitted the line of apices would be procurved. Sinus between V- and U-shaped. Spines much stouter than bristles, truly spiniform, inserted close to edge of ectal tooth. Sides of anterior portion straight, slanting directly back from spine. Prosternum 1.4 to 1.5 times wider than long. Distance between chitinous spots 3.25–3.27 times dental line; 2.5–2.66 times the width at level of bottom of sinus (Plate 2, fig. 1).

First dorsal plate 1.63–1.66 times wider than long. Especially the more caudal dorsal plates conspicuously depressed transversely in front of the caudal border and within and parallel with each lateral border, especially of caudal portion, of plate and the edges outside the depression more or less bent upwards. Plates not roughened: Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced, the processes rather wide and distally narrowly rounded, not acute.

Coxal pores small, circular: 4, 4, 4, 4; 4, 3, 3, 3; 4, 3, 4, 4; 4, 3, 3, 4; etc.

Spines of first legs, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 3}$ (σ) or, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 3}$ (observed only in φ); of the second to eighth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the ninth, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the tenth to thirteenth, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$; of the penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 1}$ (σ) or, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ (mostly φ); of the anal, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 2, 1}$ or, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 1}$, the claw single. None of the coxae laterally armed.

Posterior legs of females short and very slender, not at all thickened. In the anal legs of the male the fourth and fifth joints are conspicuously expanded laterally but are not thickened dorsoventrally and thus appear flattened; the fifth joint as a whole markedly bowed ventrad and longitudinally furrowed along the dorsal surface, the fourth joint also furrowed but not so deeply so; fourth and, especially, the fifth joints with numerous straight hairs, the other joints being more sparsely clothed; sixth joint abruptly much more slender than the fifth (Plate 2, fig. 2, 3). Penult legs of male with fourth and fifth joints somewhat enlarged, the fifth joint decidedly more elevated distad and bearing upon dorsal surface toward mesal side of anterior end of elevated portion a low rounded eminence (Plate 2, fig. 4).

Gonopods of male distinctly exposed; flattened; distally subtruncate; bearing many hairs.

Claw of female gonopods long, moderately curved, excavated and thin, acute. Spines 3 + 3, conical from base, acute; ectal one much longer than most mesal. Inner side of first article well chitinized, bent ectad at base but not truly excavated.

Males clearly exceeding the females in average size, ranging from 21 to 30 mm. (mostly 25–30 mm.) in length as against 16–21 mm. (mostly 18–20 mm.) for the females. In a male 30 mm. long the eighth and tenth plates are 3.2 mm. wide; and in a female 20 mm. long the width of eighth plate is 2.2 mm.

Praematurus.—Light brown, head somewhat darker and of dilute chestnut tinge. Antennae like head as are also prosternum and prehensors or those a little lighter. Venter pale, often but not always of a strong greenish tinge. Legs pale, uniform.

Antennae as in adult.

Ocelli 1 + 3, 3, 1; 1 + 3, 3, 2. Organ of Tömösvary in outline smaller than largest seriate ocelli and larger than the smallest ones.

Prosternum as in *maturus*, on the teeth adjacent to sinus in some relatively smaller. Spines a little more slender.

Coxal pores 4, 3, 3, 3; 3, 3, 3, 3.

Spines 3 + 3 or sometimes 3 + 2 and more rarely only 2 + 2,

but the most mesal spine on each side much smaller, the median one of each side intermediate; all more slender and acute than in *maturus*.

Spines of first legs, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 3}$; of second to fifth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of sixth and seventh the same or, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the other legs same as in adult.

Claw of female gonopods shorter than in adult and only slightly curved distad or in some essentially straight; acute, pale.

Length 15–17 mm.

Immaturus.—Dorsum pale greenish brown. Head commonly a little darker and a clearer brown. Antennae light brown to dilute chestnut. Venter more distinctly greenish than the dorsum. All legs pale.

Body apparently more decidedly narrowed caudad from the middle than in *maturus*.

Antennae composed of nineteen to twenty articles; articles five, six, and seven, and twelve and thirteen shorter than adjacent ones. Ultimate article proportionately long, equalling or exceeding in length the three preceding ones taken together.

Ocelli 1 + 3, 2, 1; 1 + 2, 2; 1 + 2, 1. Single ocellus clearly largest.

Prosternal teeth 3 + 3 but the most mesal on each side minute or indicated by a mere point. Spines distally more slender and bristle-like than in the adult.

Coxal pores, 3, 2, 2, 2; 2, 2, 2, 2.

Spines of first legs, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 3}$; of the second, $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 3}$ or dorsal spines 0, 0, 3, 2, 2; of the third to seventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of the others as in *maturus* excepting for lack of dorsal spine on coxae of ninth to thirteenth and sometimes fourteenth legs. The dorsal spines of coxae of anal and penult legs very small and slender.

Claw of female gonopods short, pale, acute, not at all curved. Spines 1 + 1; appearing as minute, acute points.

Length 11–14 mm.

Pullus IV.—Pale brown. Head and antennae a little darker, of chestnut tinge. Venter lighter than dorsum. Legs all pale.

Antennae composed of sixteen articles, of which the fifth and sixth and the tenth and eleventh are distinctly shorter than the adjacent ones.

Ocelli 1 + 2, 1. All pale. Single one largest.

Prosternal teeth 2 + 2. Sinus subsemicircular. Spine short, acute, more slender than in older stages.

A single pore on each twelfth coxa.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 1, 1}$; of the second, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 1, 2}$ or, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 2, 2}$; of the third to fifth, $\frac{0, 0, 1, 2, 2}{0, 0, 1, 2, 2}$; of the seventh, $\frac{0, 0, 1, 2, 2}{0, 0, 1, 2, 3}$; of the eighth, $\frac{0, 0, 3, 2, 2}{0, 0, 1, 2, 3}$ or ventral spines may be 0, 0, 2, 3, 3; of the ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ or ventral spines 0, 0, 2, 3, 3; of the tenth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$; of the eleventh and twelfth, $\frac{0, 0, 1, 0, 0}{0, 0, 1, 1, 0}$.

Anal glands very large and distinct.

Length *circa* 7.75 mm.

TYPE.—M. C. Z., No. 552, California: Friant.

PARATYPES.—M. C. Z., No. 545–548, 550–551, 553, California: Friant; M. C. Z., No. 549, Fresno. R. V. and S. C. Chamberlin.

Numerous specimens were taken at Friant under stones in the open near the mouth of the canyon. The conspicuous difference in size between the sexes suggests that occurring in *Pseudolithobius megaloporus*.

GOSIBIUS (GOSIBIUS) MONICUS Chamberlin.

Ann. Ent. soc. Amer., 1912, 5, p. 146.

DIAGNOSIS.—Brown with a darker middorsal stripe; head light ferruginous. Articles of antennae above twenty-nine in number. Ocelli fifteen to seventeen in four series. Prosternal teeth 2 + 2. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced. Basal spines of female gonopods 2 + 2. Dorsal spines of anal legs 1, 0, 3, 2, 2 (or 1[?]); ventral, 0, 1, 3, 3, 1; claws two. Dorsal spines of tenth or eleventh to penult legs 1, 0, 3, 2, 2; of third to ninth or tenth, 0, 0, 3, 2, 2. Ventral spines of fifth to ninth legs 0, 0, 2, 3, 3; of tenth and eleventh 0, 0, 3, 3, 3; of twelfth and thirteenth 0, 1, 3, 3, 3; of penult 0, 1, 3, 3, 2; of first to fourth 0, 0, 2, 3, 2. Length 14–15 mm.

DESCRIPTION.—Dorsum brown with a darker median longitudinal stripe which shows a marked tendency to spread laterad at the caudal end of each plate and may reach the lateral margins along the caudal border. Head subferruginous, the median longitudinal stripe of dorsum of body continuing upon it as far as a little caudad of frontal suture where it ends abruptly at a pale transverse band along the suture. Antennae similar to head. Prosternum and prehensors pale ferruginous. Venter yellow or testaceous, the caudal segments darker, somewhat ferruginous. Legs yellow or testaceous like venter, nearly uniform or the caudal pairs slightly darker dorsally.

Body rather robust, in type being only seven times longer than width of tenth plate. Moderately narrowed cephalad; strongly and uniformly narrowed caudad. Eighth and tenth plates of same width or the eighth a little wider, these clearly wider than the head. First plate slightly narrower than the third in female. Widths of head and of first, third, eighth, and tenth plates to each other as 53:47:48:57:57.

Head subcordate. Wider than long in ratio 47:45. Caudal margin mesally gently incurved, the sides conspicuously converging from marginal breaks caudad and rounding about corners. A median longitudinal sulcus extends cephalad from the suture to a transverse depression between the antennae. A short, deep transverse sulcus a little in front of caudal marginal elevation, the same more weakly indicated farther laterad on each side. Head smooth and shining, not punctate or rugose.

In types the antennae have their ends broken off so that precise number of articles cannot be determined; but at least twenty-nine are present. The articles present are of nearly same form and proportions as in *G. paucidens*.

Ocelli fifteen to seventeen in four series: *e. g.*, 1 + 4, 4, 4, 2; 1 + 5, 4, 4, 2; 1 + 4, 4, 4, 4; 1 + 4, 4, 3, 4. Much as in *G. paucidens*.

Prosternum 1.6 times wider than long. Distance between chitinous spots 2.1 times width at sinus; 3.9 times dental line. Teeth 2 + 2, stout, conical, relatively larger than in *paucidens*. Spine long, distally drawn out in bristle-like form, its tubercle contiguous with base of outer tooth, attached on ventral side of edge.

First dorsal plate smooth and shining like the head or only obscurely roughened. Other plates more or less roughened, the more caudal ones most strongly so. Major plates with the usual short transverse submarginal sulci near caudal third, the seventh having an additional similar one on each side at about middle of length. A longitudinal sulcus on each side midway between median line and lateral margin, the sulcus at about beginning of the middle third sending a more clearly impressed branch directly mesad where it often unites with corresponding one of other side; often also a shorter sulcus running from near anterior margin obliquely caudoectad toward point of origin of this transverse branch.

Ventral plates appearing smooth and shining. The usual three longitudinal impressions indicated with varying degrees of distinctness. On several of the caudal sternites the median mark may end caudad in a deeper pit-like and somewhat transverse depression a little in front of the caudal margin.

Coxal pores circular and small: 4, 3, 3, 3 in types.

Spines of first legs, $\begin{smallmatrix} 0, 0, 2, 2, 1, \\ 0, 0, 2, 3, 2; \end{smallmatrix}$ of the second, $\begin{smallmatrix} 0, 0, 3, 2, 1, \\ 0, 0, 2, 3, 2; \end{smallmatrix}$ of the third and fourth, $\begin{smallmatrix} 0, 0, 3, 2, 2, \\ 0, 0, 2, 3, 2; \end{smallmatrix}$ of the fifth to ninth, $\begin{smallmatrix} 0, 0, 3, 2, 2, \\ 0, 0, 2, 3, 3; \end{smallmatrix}$ of the tenth and eleventh, $\begin{smallmatrix} 1, 0, 3, 2, 2, \\ 0, 0, 3, 3, 3; \end{smallmatrix}$ or coxal spine may be absent from tenth; of the twelfth and thirteenth, $\begin{smallmatrix} 1, 0, 3, 2, 2, \\ 0, 1, 3, 3, 3; \end{smallmatrix}$ of the penult, $\begin{smallmatrix} 1, 0, 3, 2, 2, \\ 0, 1, 3, 3, 2; \end{smallmatrix}$ of the anal, $\begin{smallmatrix} 1, 0, 3, 2, 2, \\ 0, 1, 3, 3, 1; \end{smallmatrix}$ claws 2. Last four pairs of coxae laterally armed. Dorsal spine of eleventh coxae small.

Anal legs of female short and moderately slender; the dorsal surface of femur and tibia distinctly longitudinally furrowed, the same articles of penult legs, especially the femur, similarly but less strongly furrowed.

Male unknown.

Gonopods of female long. Claw large, of usual form. First article strongly constricted at base leaving a conspicuous lobe distad projecting mesad and touching corresponding lobe of the other gonopod, the anterior edge of these lobes at right angles to longitudinal axis of body or nearly so; mesal side strongly chitinated as in *G. paucidens*. Spines 2 + 2; stout; inner smaller than the outer one on each side. Process of sternite first clavately widening, presenting a point on each side, and then narrowing distad and becoming very slender and acute.

Length of types (♀ ♀) 14–15 mm. The specimen 14 mm. long has anal leg 5.8 mm. long and tenth plate 2 mm. wide.

TYPE.—M. C. Z. No. 578, California: Santa Monica, June, 1909.

This species is manifestly close in many features to *G. paucidens*. It differs clearly, however, in much smaller size, in having the anal legs armed with two distinct claws, in ventral spines of anal legs, in dorsal spines of anterior pairs, in having the basal spines of female gonopods 2 + 2, etc.

GOSIBIUS (TIMIOBIUS) INTERMEDIUS, sp. nov.

Plate 3, fig. 2, 3.

DIAGNOSIS.—Brown; head dilute chestnut. Marginal breaks of head small and inconspicuous. Antennae moderate; articles twenty-eight. Ocelli seventeen in four series. Prosternal teeth 3 + 3. Posterior angles of sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced. Claws of anal legs two; dorsal spines 1, 0, 3, 2, 0; ventral 0, 1, 3, 3, 1. Dorsal spines of ninth or tenth

to penult legs 1, 0, 3, 2, 2; of first or second to eighth or ninth 0, 0, 3, 2, 2. Ventral spines of thirteenth and penult legs 0, 1, 3, 3, 3; of fourth to twelfth, 0, 0, 3, 3, 3; of first to third, 0, 0, 2, 3, 3. Last four pairs of coxae laterally armed. Anal legs in male slender, unmodified. Penult legs with a low rounded eminence on dorsal surface at distal end of tibia. Length 19 mm.

DESCRIPTION.—Brown, the first plate darker. Head darker than dorsum, in type dilute chestnut. Antennae light or yellowish brown. Legs pale, the caudal pairs more densely pigmented, yellowish. Prosternum and prehensors dilute chestnut. Venter pale testaceous, the caudal plates darker, burnt brown.

Body very conspicuously narrowed both cephalad and caudad from the eighth segment. First and third tergites equal in width. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 50:46:46:66:60:51.

Head broadly subcordate; wider than long in ratio 25:23. Lateral margined breaks very small and inconspicuous. A sharply impressed transverse sulcus in front of caudal border, slightly convex; antero-laterad from each end of this a short, oblique impressed line. The usual broad and shallow longitudinal depressions in front of the transverse sulcus, these nearly parallel and extending to the anterior end of head.

Antennae of moderate length. Articles in type twenty-eight; of these the first four or five are rather long, the others being moderate with a longer one occurring at intervals. Ultimate article shorter than the two preceding taken together.

Ocelli seventeen in four series: 1 + 4, 4, 4, 4. Single ocellus much largest. Of the seriate ocelli the most ventral are much the smallest; the dorsal ones conspicuously largest, somewhat irregular in form.

Prosternum 1.6 times wider than long. Distance between chitinous spots 2.44 times width at level of bottom of sinus; 4 times the dental line. Teeth 3 + 3; small; the most mesal on each side smallest and lowest; line of apices of teeth, omitting innermost on each side, nearly straight. Sinus small, rounded at bottom. Spines small and hair-like. Sides of anterior portion of prosternum nearly evenly convexly rounded from spine to prehensor.

First dorsal plate moderately narrowing caudad; 1.6- times wider than long. Major dorsal plates with the usual broad longitudinal depressions or furrows which diverge a little caudad; commonly each gives off anteriorly a branch which runs nearly straight cephalad to anterior margin. Plates roughened. Clothed with short, acute hairs

which are more numerous toward lateral margins and which arise mostly from small tuberculiform elevations. The seventh to tenth plates especially with the lateral margins distinctly denticulate or serrulate, the teeth on seventh to ninth longest and most acute; on the plates each way from these the irregularities become more crenulate and weak and there disappearing. Marginal hairs spring from the incisions caudad of the teeth (Plate 3, fig. 2). The fourteenth plate is narrowest a little cephalad of caudal end, the sides from there then again weakly diverging caudad; caudal margin mesally incurved (Plate 3, fig. 3). Posterior angles of sixth, seventh, ninth, eleventh, and thirteenth dorsal plates produced, but those of the sixth rather weakly so; processes broad, becoming more acute on the caudal plates.

Coxal pores circular, of moderate size: 4, 4, 4, 4.

Spines of first legs, $\frac{0, 0, 2, 3, 2}{0, 0, 2, 3, 3}$ or $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of second and third, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of fourth to eighth or ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of ninth or tenth to twelfth, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of thirteenth and penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$, claws 3; of anal, $\frac{1, 0, 3, 2, 0}{0, 1, 3, 3, 1}$, claws 2. Last four pairs of coxae laterally armed.

Anal legs in male slender, without special modifications. Penult legs also slender but with the tibia bearing a low rounded lobe or elevation on dorsal surface at distal end.

Length of type (♂) near 19 mm.; width of eighth plate 3 mm.

TYPE.—M. C. Z., No. 579, California: Santa Barbara, March, 1913.

PARATYPES.—M. C. Z., No. 580, California: Santa Barbara, March, 1913. One mature and two not fully mature males.

The serrulation of part of the dorsal plates and the unusual form of the fourteenth plate in this form are features of especial interest.

GOSIBIUS (ABATOBIUS) ARIZONENSIS, sp. nov.

Plate 2, fig. 5; Plate 3, fig. 1.

DIAGNOSIS.—Testaceous to brown, head not differing. Antennae with articles twenty-five to twenty-eight. Ocelli seventeen to nineteen in four series. Prosternal teeth 2 + 2. Posterior angles of none of dorsal plates produced. Basal spines of female gonopods 2 + 2. Anal leg with claw single; dorsal spines 1, 0, 3, 1, 0; ventral 0, 1, 3, 2, 1. Dorsal spines of twelfth to penult legs 1, 0, 3, 2, 2; of

all others 0, 0, 3, 2, 2. Ventral spines of penult legs 0, 1, 3, 3, 2; of thirteenth 0, 1, 3, 3, 3; of eighth to twelfth, 0, 0, 3, 3, 3. Last four pairs of coxae laterally armed. Anal legs in male type missing. Penult with tibia enlarged distad as usual. Length 18–22 mm.

DESCRIPTION.—Dorsum testaceous to brown, the head the same, but fifteenth plate abruptly paler; the caudal borders of plates and head may be darker as they may also be in a longitudinal median stripe. Antennae yellow to yellowish brown. Prosternum and prehensors like head or a little paler. Venter yellow or brownish yellow, the caudal plates more densely pigmented. Legs similar in color to corresponding plates of venter, the posterior pairs somewhat orange.

Body moderately narrowed cephalad from the tenth segment. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other (in ♂ type) as 52:52:51:58:57:55.

Head wider than long in ratio 52:47. Smooth. Hairs sparse.

Antennae moderately long, reaching upon the seventh segment. Articles twenty-five to twenty-eight; mostly long, those composing a varying proportion of distal portion short.

Ocelli seventeen to nineteen in four series: *c. g.*, 1 + 5, 4, 4, 3; 1 + 4, 5, 5, 3; 1 + 5, 4, 5, 4; 1 + 5, 5, 4, 3. Single ocellus largest. Seriate ocelli conspicuously decreasing in size cephalad and ventrad, varying considerably.

Prosternal teeth 2 + 2, small, well separated. Inner one on each side larger than the outer; line of apices a little procurved. Sinus between V-shaped and semicircular, the sides being concave and the bottom more or less rounded (Plate 3, fig. 1). Prosternum 1.6 times wider than long. Distance between chitinous spots 3 times width at level of bottom of median sinus; 4.4 times the dental line. Spines straight, slender, and acute, inserted a little ectad of tooth. Margin extending laterad almost horizontally a little distance from spine and then bending back caudoectad to prehensor.

First dorsal plate equalling head in width; 1.7 times wider than long. Posterior angles of none of the dorsal plates produced; posterior corners of ninth shortly obliquely excised, those of eleventh and thirteenth straight or excised on one side. Major plates mostly showing a median longitudinal furrow, and one diverging caudad from it on each side; transversely depressed in front of caudal border; the short, transverse, submarginal sulcus on each side near beginning of caudal fourth of length.

Coxal pores very small, circular; porigerous surface depressed: 4, 5, 4, 4; 4, 5, 5, 5; 4, 5, 5, 4; 5, 5, 5, 5; 4, 5, 6, 5.

Spines of first to seventh pairs of legs, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 3}$; of eighth to eleventh pairs, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of twelfth, $\frac{1, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of thirteenth, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$; of penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$; of anal, $\frac{1, 0, 3, 1, 0}{0, 1, 3, 2, 1}$, with one claw. Last four pairs of coxae laterally armed.

Penult legs of male slender; the tibia enlarging distad as usual. (Anal legs missing in ♂ of types).

Claw of female gonopods long and acute, flattened and moderately curved. Inner side of first article proximally bending ectad, well chitinized; joint constricted or broadly channelled across base (Plate 2, fig. 5).

Length 18–22 mm.

TYPE.—M. C. Z. No. 581, Arizona: Fort Williams, January, 1911. W. M. Wheeler.

PARATYPES.—M. C. Z. No. 612, Arizona: Fort Williams, W. M. Wheeler; M. C. Z. No. 611, Grand Canyon, W. M. Wheeler; M. C. Z. No. 610, Huachucha Mts., W. M. Wheeler; M. C. Z. No. 608, 613, Arizona, H. K. Morrison.

GOSIBIUS (ABATOBIUS) MONTEREUS, sp. nov.

Plate 1, fig. 5.

DIAGNOSIS.—Dark brown to chestnut, head of nearly same shade. Antennae short, articles twenty-three to twenty-seven. Ocelli fifteen or sixteen in four or five series. Prosternal teeth 2 + 2. Posterior angles of none of the dorsal plates produced. Basal spines of female gonopods 2 + 2. Claws of anal leg two; dorsal spines 1, 0, 3, 2, 0; ventral spines 0, 1, 3, 3, 1. Dorsal spines of penult and thirteenth legs 0, 0, 3, 2, 2 or 1, 0, 3, 2, 2; ventral, 0, 1, 3, 3, 2. Ventral spines of twelfth legs 0, 0, 3, 3, 2; of fourth to eleventh 0, 0, 2, 3, 2; of first, 0, 0, 1, 3, 1. Last one or two pairs of coxae laterally armed. Length of female 15–17 mm.

DESCRIPTION.—Dorsum dark brown to chestnut, darker along a median dorsal line. Head of nearly same shade as dorsal plates or, in paler specimens, darker. Antennae chestnut, uniform. Leg light brown excepting the posterior pairs which, excepting proximally, are dusky, appearing blackish brown or dark chestnut. Prosternum and prehensors chestnut, sometimes more of a dark brown. Venter brown to testaceous.

Body typically strongly narrowed cephalad from the eighth segment, with the first segment distinctly narrowest. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 36:32:34:44:45:44.

Head suborbicular, widest at level of lateral breaks; wider than long in ratio 18:17. A semicircular depression in front of the caudal border, its ends continuing cephalad as more obscure and broader diverging furrows or depressions. Punctae fine and sparse.

Antennae short, strongly attenuated distad. Articles, so far as noted, from twenty-three to twenty-seven; decreasing distad from the second, and most moderately short in antennae with the lesser number of articles to very short and crowded in those with the larger number. The ultimate article typically longer than the two preceding ones taken together.

Ocelli fifteen to sixteen in four or five series: 1 + 4, 4, 3, 3; 1 + 1, 4, 4, 3, 2, the ocellus of first series at anterior end of patch; 1 + 4, 3, 3, 3, 2. Single ocellus very much the largest. Ocelli of top series larger than others, the ocelli of others decreasing cephalad and ventrad as usual.

Prosternum 1.54 times wider than long. Distance between chitinous spots 2.4 times width at level of bottom of sinus; 3.7 times the dental line. Median sinus very shallow; wide and semicircular. Teeth 2 + 2; equal in size or inner one of each pair a little the larger, moderate, acute; line of apices recurved. Spines fine and hair-like, inserted caudad of margin close to ectal tooth. Margin rounding out ectad from teeth on each side as usual and then bending back straight ectocaudad.

First dorsal plate widest cephalad, its sides moderately converging caudad; 1.68 times wider than long. Other major dorsal plates showing more or less clearly a longitudinal furrow each side of the middle line from which it diverges a little caudad. Under lens these plates, excepting the first one or two and the fifteenth, those of the posterior region especially, are seen to be roughened, tuberculo-rugose, most strongly so on caudal and lateral portions of plate. Hairs short. Posterior corners of none of the dorsal plates produced; those of ninth, eleventh, and thirteenth rounded or obliquely excised.

Coxal pores small: 3, 3, 3, 3; 3, 3, 4, 3; 3, 4, 4, 3.

Spines of first legs, $\frac{0, 0, 2, 2, 1}{0, 0, 1, 3, 1}$ or dorsal spines 0, 0, 2, 1, 1; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 1, 3, 2}$ to $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 2}$; of the third, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 3, 2}$ to $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the fourth to eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$; of the thirteenth and penult, $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ or $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$; of the anal, $\frac{1, 0, 3, 2, 0}{0, 1, 3, 3, 1}$, claws two.

Last one or two pairs of coxae laterally armed, the spine on penult, when present, small.

Claw of female gonopods long and acute, excavated and strongly curved. Basal spines 2 + 2; long and moderately stout, conically acuminate from very base and uniformly so or a little more abruptly narrowing toward tip. First article conspicuously excavated on mesal side at proximal end. Process of sternite distally, truncate or convex.

Length 15-17 mm. (♀ ♀. The ♂ unknown).

TYPE.—M. C. Z. No. 582, California; Pacific Grove, March, 1913.

PSEUDOLITHOBIUS Stuxberg. ⁽²⁰⁾

Öfvers. K. vet.-akad. Förhandl., 1875, no. 3, p. 8; Proc. Cal. acad. sci., 1877, 7, p. 137. Latzel, Myr. Öst.-Ung. Mon., 1880, th. 1, p. 35. Bollman, Bull. 46, U. S. N. M., 1893, p. 164. Verhoeff, Die Chilop., 1907, p. 240. Chamberlin, Pomona college journ. ent., 1910, 2, p. 369; Can. ent., 1911, 42, p. 377.

Head with lateral margins essentially continuous, no true breaks occurring.

Antennae short; articles twenty to twenty-two.

Eyes composed of seriate ocelli.

Prosternal teeth 3 + 3 or 4 + 4. Spine near ectal angle of anterior margin, stout and subdentiform.

Pores present on last five pairs of coxae; circular and uniseriate.

Penult legs in male with the fifth article enlarging distad as in Gosibius (Plate 3, fig. 5). Anal leg with fifth article conspicuously longitudinally furrowed dorsally and bowed ventrad as in some species of Gosibius (Plate 4, fig. 1).

Dorsal spines of anal legs 1, 0, 3, 2, 2; ventral, 0, 1, 3, 3, 1; (claws in type species 2). Dorsal spines of penult legs 1, 0, 3, 2, 2; ventral 0, 1, 3, 3, 2 or 0, 1, 3, 3, 3. (Third and fifth joints of all legs cephalad of fourteenth with three ventral spines in type species).

Gonopods of male short; uniarticulate.

Claw of female gonopods large and entire. Basal spines stout; (in type species 3 + 3 or 3 + 4). First article broad, inner side well chitinized, constricted at base as usual in the family.

TYPE.—*P. megaloporus* Stuxberg.

This appears to be the only species of the Lithobioidae to bear pores on all the last five pairs of coxae; but in the Henicopidae, Zygethobius agrees in this distribution of the pores.



Fig. 2. Distribution of *Pseudolithobius*.

PSEUDOLITHOBIUS MEGALOPORUS (Stuxberg).

Plate 3, fig. 4, 5; Plate 4, fig. 1, 2.

Lithobius megaloporus Stuxberg, Öfvers. K. vet.-akad. Förhandl., 1875, no. 2, p. 69; Ann. mag. nat. hist., 1875, ser. 4, **15**, p. 190.

Lithobius (*Pseudolithobius*) *megaloporus* Stuxberg, Öfvers. K. vet.-akad. Förhandl., 1875, no. 3, p. 14; Proc. Cal. acad. sci., 1877, **7**, p. 137.

Pseudolithobius megaloporus Chamberlin, Pomona college journ. ent., 1911, **3**, p. 470; Can. ent., 1911, **42**, p. 381.

DIAGNOSIS.—Dorsum brown, first tergite and caudal borders of others often darker; head darker and more reddish. Antennae short, articles twenty to twenty-two. Ocelli only five to seven in two or three series. Prosternal teeth 3 + 3 or 4 + 4. Posterior angles of ninth, eleventh, and thirteenth dorsal plates produced. Basal spines of female gonopods 3 + 3 or 4 + 4. Dorsal spines of tenth to anal pairs of legs 1, 0, 3, 2, 2. Ventral spines of anal legs 0, 1, 3, 3, 1; claws two but the accessory one minute. Ventral spines of tenth to penult legs 0, 1, 3, 3, 3 or those of penult sometimes 0, 1, 3, 3, 2; of the others 0, 0, 3, 3, 3 with dorsal spines 0, 0, 3, 2, 2. Last two pairs of coxae laterally armed. Length of female up to 31 mm.; of male up to 41 mm.

DESCRIPTION.—Dorsum brown, often reddish, the first tergite commonly darker and more reddish and the other tergites also frequently darkened along the caudal borders. Head and prosternum with prehensors usually but not always darker and more reddish than the dorsum. Antennae brown to reddish brown, uniform. Venter lighter brown, mostly devoid of any red tinge excepting on caudal segments, sometimes with olivaceous cast. Legs light brown, mostly uniform, the caudal pairs in some a little darker than others.

Body slightly widest at about fifth segment from where it is nearly of the same width caudad to the tenth segment; only little narrowed cephalad of fifth segment, the sides thus being nearly parallel over most of length. Males proportionately more slender than females, being commonly 10 times longer than width of tenth plate, as against 8.5 times in the female.

Head nearly equal in length and breadth but commonly a little wider (20:19). Widest a little in front of the well-rounded caudal corners from where nearly of same width forward to middle. Strongly margined caudally and along the sides. Commonly elevated in front of suture and complanate behind it; a short median longitudinal

furrow bisecting the elevated portion. Finely punctate and weakly irregularly rugose.

Antennae short. Articles twenty to twenty-two, of which the arrangement is usually about as follows:—the first four long, the seventh and eighth short with the fifth and sixth intermediate; the ninth, tenth, and eleventh long, the twelfth and thirteenth intermediate and the fourteenth and fifteenth very short; the next three long, the nineteenth intermediate, the twentieth and twenty-first short. That is, the antennae thus show several successive divisions beginning with long articles and ending in short ones which are mostly in groups of two, the seventh and eighth and fourteenth and fifteenth especially being normally very short.

Eye area small and elongate in form. Consisting mostly of five to seven, but sometimes up to nine ocelli arranged in two series, occasionally in three series: *e. g.*, 1 + 3, 2; 1 + 3, 3; 1 + 4, 4; 1 + 3, 3, 2. Organ of Tömösvary in outline small.

Anterior portion of prosternum trapeziform, the lateral margins being substraight. Teeth 3 + 3 or 4 + 4, the innermost tooth on each side is typically on side of sinus; outermost tooth on each side a little more widely removed. Spine stout and conical, inserted a little proximad of anterior margin on ventral side. Prosternum 1.66 times wider than long. Chitinous lines strongly marked cephalad, but fading out caudad.

Dorsal plates depressed longitudinally immediately mesad of turned up lateral edges, median portion not strongly convex, caudal portion depressed. A weak longitudinal furrow each side of middle diverging from its mate caudad; from its caudal end or near it a second furrow diverges from it cephalad. Surface moderately uneven or rugose. The major plates unusually long, longer relatively in the male than in the female as shown by the following measurements:—

Tergite No.	Male		Female	
	Length	Width	Length	Width
1	2.6 mm.	4 mm.	2 mm.	3.1 mm.
3	4	4.1	3	3+
5	4.9	4.2	3.1	3.2
7	4	4.1+	2.2	3.2
8	4.1+	4.1+	3	3.2
10	5	4.1	3.2	3.2
12	5	4	3+	3+

(The total length of male measured 41 mm.; of female 27 mm.).

The ventral plates are also long and similarly relatively longer in the male than in the female. Measurements from the same two individuals are as follows:—

Sternite No.	Male		Female	
	Length	Width	Length	Width
1	1.1 mm.	1 mm.	.6 mm.	1 mm.
2	2	1.6	1.1	1.8
3	2.4	2.1	1.4	2
4	2.6	2.1	1.7	2
5	2.8	2.7	1.7	2.1
6	3—	2.9	1.9	2.2
7	3.1—	2.3	2.1	2.3
8	3.1	2.7	2.1	2.2
9	3.1	2.9	2.1	2.3+
10	3.2	3	2.1	2.3
11	3.2	2.8	1.6	2.1
12	3	2.8	1.3	2.1
13	2.9	3+	1.2	2.1
14	1.5	2.1	1.1	2

From this table it will be seen that, excepting the last few, the sternites in the male are all longer than wide whereas in the female they are wider than long. The ventral plates are bowed ventrad, from end to end; the anterior end of outer more anterior plates more strongly bent dorsad and making a distinct angle, which in some is nearly right, with adjoining portion of plate. Depressed within each lateral edge. Median and caudal plates with a median and two lateral longitudinal sulci which do not extend over anterior portion of plate; especially the median sulcus disappearing in more cephalic plates. Plates irregularly roughened and densely punctate.

Coxal pores moderately large, circular or a little transversely elongate or elliptical; their edges elevate and strongly chitinated; porigerous surface depressed, the bordering rims well chitinated: 4, 4, 4, 4, 5, 5, 5, 5, 5; 5, 5 (6), 5, 5, 5.

Spines of first to ninth legs, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 3}$; of the tenth to thirteenth, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$; of the penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 3}$ or with ventral spines 0, 1, 3, 3, 2, claws two; of anal, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 1}$, claws two but the accessory one very small. Last two pairs of coxae laterally armed.

Anal and penult legs in female slender, their prefemora, as also in the male, strongly laterally compressed, the immediately preceding ones also showing this compression, broader dorsally than ventrally,

a section being wedge-shaped. In the male the tibia of anal legs is widened and is conspicuously bowed ventrad, furrowed longitudinally above (Plate 4, fig. 1). In the penult legs of male the tibia is elevated over distal half of length (Plate 3, fig. 5).

Gonopods of male short and broad, rounded; bristles long.

Claw of female gonopods very long, strongly curved; blackish. Basal spines 3 + 3 or 3 + 4; conically acuminate from base or near it, decreasing in size from outermost to innermost. Proximal article broad, constricted at base (Plate 3, fig. 4).

Length of males up to 41 mm.; of females up to 31 mm. A male 30 mm. long has antennae 11 mm. and anal legs (exclusive of coxae) 12.5 mm. long.

Agentialis.—Stuxberg's original description was manifestly based upon very young specimens, these being of the *agenitalis* stage as indicated by several points in his description. The original description, rearranged, is as follows:—

Lamina cephalica obcordata, hirsuta, margine postico subrecto, elevato, parte antica sulco profundiore a postico sejuncta.

Antennae perbreves, articulis 19–20 compositae, ex quibus ultimus longissimus, tres antecedentia junctos longitudine aequans, 2°, 3°, 8°, 9°, 10°, 14°, 15°, 16° mediocribus, ceteri latitudine duplo majore quam longitudine minime.

Oculi ocellis 7 magnis in 2 series (1 + 3, 3) digestis.

Coxae pedum maxillarium secundi paris dentibus 2 + 2–3 + 3 crassis acumine nigris armatae, sinu mediano lato, hand profundo.

Scuta dorsualia 9^{um}, 11^{um}, 13^{um} angulis productis, 2^{um}, 4^{um}, 6^{um}, 7^{um} margine portico recto, 1^{um}, 9^{um} convexo, 3^{um}, 5^{um}, 8^{um}, 10^{um}, 12^{um}, 14^{um} sinuato.

Scuta ventralia omnia, praesertim marginibus, setis longis, magnis vestito, medii corporis sulco profundiore longitudinali mediano laterali minore et brevior, ex angulo postico laterali excurrente.

Pori coxales 2, 2, 1, 1, 1 maximi, rotundi.

Pedes primi paris calcaribus 1, 1, 1. Pedum analium articulus primus calcaribus nullis, setis 2 longioribus, altera ventrali, altera laterali armatus.

Pedes anales perbreves, longitudinem antennarum non assequentes, incrassati, ungue singulo, calcaribus 0, 1, 1, 0 armati.

Color dorsi testaceo-brunneus, laminis ventralibus pedibusque pallidioribus.

Longitudo corporis 12 mm.; antennarum 4 mm.; pedum analium 2.5 mm.

TYPE LOCALITY. — California: near San Francisco (G. Eisen). Also taken in California at Sausalito, (M. C. Z., No. 586, 587); Oroville, (M. C. Z. No. 584, 585).

The type locality, "near San Francisco", was probably Sausalito, from where numerous specimens have been examined. I found the species to be very common about Oroville. In April it occurred under stones and other objects lying in open treeless areas. They seemed slow to take alarm, often remaining quite unconcerned after stones had been removed from over them and they themselves touched or jarred, and appearing generally more sluggish than most related forms. The conspicuous difference in size and form of the sexes in this species is noteworthy.

GUAMBIUS Chamberlin. 206

Ann. Ent. soc. Amer., 1912, 5, p. 144.

Head with lateral marginal breaks.

Antennae short or moderate; articles from twenty-four to thirty-five.

Eyes composed of seriate ocelli; single ocellus enlarged.

Prosternal teeth 2 + 2; sinus of good size, mostly between V- and U-shaped. Spines always more slender than the teeth, varying from truly spiniform to the more slender, distally bristle-like form.

Either posterior angles of ninth, eleventh, and thirteenth dorsal plates produced (Sibibius) or those of eleventh and thirteenth, at least of latter, more weakly produced (*Guambius sens. str.*).

Anal legs in the male with the fourth article more or less conspicuously crassate and longitudinally furrowed above; the fifth article commonly much less crassate, somewhat elevated along dorsal side but not conspicuously modified. Fifth article of penult legs obliquely planate or excised at distal end above and there bearing a conspicuous lobe or crest of characteristic form (Plate 4, fig. 5; Plate 5, fig. 3, 5, 6; Plate 6, fig. 1).

Dorsal spines of anal legs 1, 0, 3, 2, 1 or 1, 0, 3, 2, 2 (Sibibius) to 0, 0, 3, 1, 0 or 1, 0, 3, 1, 0 (*Guambius sens. str.*); ventral 0, 1, 3, 3, 1 to 0, 1, 3, 2, 0; claws two or three. Dorsal spines of penult legs 1, 0, 3, 2, 2 or 0, 0, 3, 2, 2 (♀) and 7, 0, 3, 2, 1 or 0, 0, 3, 2, 1 (♂) (Sibibius) to 1, 0, 3, 1, 1 or 0, 0, 3, 1, 1 (*Guambius sens. str.*); ventral, 0, 1, 3, 3, 2 or 0, 1, 3, 3, 1; claws three. Dorsal spines of thirteenth



Fig. 3. Distribution of *Guambius*.

legs 1, 0, 3, 1, 1 or 0, 0, 3, 1, 1 to 0, 0, 3, 2, 2; of twelfth 0, 0, 3, 2, 2 to 0, 0, 3, 1, 2. Last one or two pairs or none of posterior coxae laterally armed.

Gonopods of male uniarticulate.

Claw of female gonopods large and strictly entire. Basal spines stout, 2 + 2. Mesal side of first article well chitinized; article constricted or furrowed about base, commonly appearing excavated on mesal side at proximal end as usual in the family.

Length 9 to 15.5 mm.

TYPE.—*G. euthus* (Chamberlin).

Sibibius is removed from *Arenobius*, under which it was originally placed as a subgenus, chiefly because of the pronounced differences in the prosternum and in the modifications of the posterior legs. It is united tentatively with *Guambius* because of close agreement in the secondary sexual characters of the males, although the differences in the spining of the legs and in the angulation of the dorsal plates with other lesser ones make it seem likely that, with more thorough acquaintance with the chilopod fauna of the southern United States and Mexico, it will be found advisable or necessary to treat it as a separate genus. The distribution of the known species is indicated on (Fig. 3).

Key to Subgenera and Species of Guambius.

- a. Posterior angles of only the eleventh and thirteenth dorsal plates produced, or production of these also but slight; dorsal spines of anal legs 0, 0, 3, 1, 0; of penult, 0, 0, 3, 1, 1.

Guambius Chamberlin *sens. str.*

- b. Ventral spines of penult legs 0, 1, 3, 3, 2.

G. euthus (Chamberlin).

- bb. Ventral spines of penult legs 0, 1, 3, 3, 1 or 0, 1, 3, 2, 1.

- c. Ventral spines of first legs, 0, 0, 0, 0, 1.

G. pinguis (Bollman).

- cc. Ventral spines of first legs 0, 0, 1, 1, 1 or 0, 0, 1, 2, 1.

- d. Trochanter of thirteenth legs armed; ventral spines of anal legs 0, 1, 3, 2, 1 or 0, 1, 3, 3, 1.

G. mississippiensis (Chamberlin).

- dd. Trochanter of thirteenth legs unarmed; ventral spines of anal legs 0, 1, 3, 2, 0....*G. curtior*, sp. nov.

- aa. Posterior angles of ninth, eleventh, and thirteenth dorsal plates

produced; dorsal spines of anal legs 1 (10), 0, 3, 2, 1; of the penult, 1 (10), 3, 2, 2 or 1 (10), 3, 2, 1. . . *Sibibius* Chamberlin.

- b. Articles of antennae 30-35; ventral spines of thirteenth legs normally 0, 0, 3, 3, 2; claws of anal legs two

G. coloradanus (Chamberlin).

- bb. Articles of antennae mostly 24-26; ventral spines of thirteenth legs normally 0, 1, 2, 3, 2; claws of anal legs three.

G. oedipes (Bollman).

GUAMBIUS (GUAMBIUS) CURTIOR, sp. nov.

Plate 5, fig. 6; Plate 6, fig. 1, 2.

DIAGNOSIS.—Dorsum testaceous, caudal plates darker; head deep cherry-red. Antennae very short; articles twenty-five. Ocelli nine or ten in three series. Body about 6.3 times longer than width of tenth plate. First tergite two times as wide as long. Anal leg of male crassate, the fourth joint particularly so. Penult legs more slender, the fourth joint most inflated; crest of fifth article subtriangular in lateral view, highest distad (Plate 5, fig. 6). Anal legs with two claws; dorsal spines 0, 0, 3, 1, 0; ventral, 0, 1, 3, 2, 0. Dorsal spines of penult legs 0, 0, 3, 1, 0; ventral, 0, 1, 3, 3, 1; claws two. Dorsal spines of thirteenth legs 0, 0, 3, 2, 2; ventral, 0, 0, 3, 3, 2. Ventral spines of twelfth legs 0, 0, 2, 3, 2. Dorsal spines of second legs 0, 0, 1, 2, 1; ventral same or 0, 0, 1, 1, 1. None of coxae armed. Length 8.5 mm. (male type).

DESCRIPTION.—Dorsum testaceous, posterior plates and caudal margins of same anterior ones darker, more reddish. Head deep cherry-red. Antennae similar to head proximally, lighter distally. Prosternum dark but less reddish than the head. Venter pale testaceous, the anterior and especially the posterior plates darker. Legs pale testaceous, the posterior pairs more densely pigmented, more or less orange.

Body wide, relative to length, being in the type 6.3 times longer than the width of the tenth plate. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 30: 27: 30: 37: 37: 33.

Head as wide as long or only slightly wider. Of uniform width between eyes and marginal breaks. Hairs short and sparse.

Antennae very short; articles twenty-five short and decreasing distad as usual, closely united. Hairs short.

Ocelli nine or ten in three series: 1 + 4, 3, 2; 1 + 3, 3, 2.

Prosternum 1.6 times wider than long. Distance between chitinous spots 2 times width at level of bottom of mesal incision; 3.1 times the dental line. Median sinus rather small, widely V-shaped with sides somewhat concave. Teeth acute, subequal; line of apices recurved. Tubercle distinct, contiguous with base of ectal tooth; spine slender, bristle-like.

First dorsal plate 2 times wider than long; sides nearly straight, considerably diverging cephalad, rounded only at ends. Eleventh and thirteenth plates with the caudal corners distinctly produced; ninth plate with the corners rectangular or a little obliquely excised.

Spines of first legs, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 1, 1}$ or ventral spines 0, 0, 1, 2, 1; of the second, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 2, 1}$; of the fourth and fifth, $\frac{0, 0, 1, 2, 2}{0, 0, 1, 2, 1}$; of the sixth and seventh, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 1}$; of the eighth, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 2}$; of the ninth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$; of the tenth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the eleventh and twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the thirteenth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$; of the penult, $\frac{0, 0, 3, 1, 0}{0, 1, 3, 3, 1}$; claws two; of the anal, $\frac{0, 0, 3, 1, 0}{0, 1, 3, 2, 0}$; claws two. None of the cónae at all armed.

Anal legs of male with the fourth joint in particular strongly inflated and conspicuously longitudinally furrowed dorsally; fifth joint uniformly rounding up dorsally as usual; tarsi slender. Penult legs more slender than the anal, the fourth joint not relatively more inflated than the adjoining ones; fifth article obliquely dorsocaudally complanate or excised at distal end and their bearing a longitudinally placed, laterally compressed low crest, the dorsal edge of which begins proximally at surface of joint and rises to distal end, in lateral view being thus subtriangular (Plate 5, fig. 6).

Gonopod of male bearing about four bristles.

Length of type (♂) 8.5 mm.; antennae 2.5 mm.; width of tenth plate 1.35 mm.

TYPE.—M. C. Z., No. 605, Mississippi: Gulfport.

GUAMBIUS (GUAMBIUS) MISSISSIPPIENSIS Chamberlin.

Plate 5, fig. 4, 5.

Ann. Ent. soc. Amer., 1912, 5, p. 144.

Lithobius oedipes Chamberlin (non Bollman), Ann. Ent. soc. Amer., 1911, 4, p. 43.

DIAGNOSIS.—Testaceous to clear brown; head cherry-red to almost black. Antennae short; articles twenty-five or twenty-six. Ocelli nine to fifteen in three or four series. Body 7.25 to 7.85 times

longer than width of tenth plate. First dorsal plate near 1.8 times wider than long. Posterior angles of eleventh and thirteenth dorsal plates more or less produced. Anal legs of male strongly crassate, the prefemur elevated and deeply longitudinally furrowed. Penult legs similarly crassate; tibia with lobe (Plate 5, fig. 5). Claws of anal legs two; dorsal spines 0, 0, 3, 1, 0; ventral, 0, 1, 3, 3, 1-0, 1, 3, 2, 1. Dorsal spines of penult legs 0, 0, 3, 1, 1; ventral 0, 1, 3, 3, 1-0, 1, 3, 2, 1; claws two. Dorsal spines of thirteenth legs, 0, 0, 3, 2, 2; ventral 0, 1, 2, 3, 2. Ventral spines of twelfth legs, 0, 0, 2, 3, 2. Dorsal spines of second legs 0, 0, 1, 2, 1; ventral the same. Dorsal spines of first legs 0, 0, 1, 1, 1; ventral, 0, 0, 1, 2, 1. None of coxae armed. Length 10-14 mm.

DESCRIPTION.—Dorsum dilute chestnut with the caudal plates and a median longitudinal line somewhat darker. Head and antennae dark chestnut, the latter paler distad. Venter testaceous, darker brown caudad. Prosternum and prehensorial feet nearly the same as head. Legs testaceous, the caudal pairs a little darker.

Body strongly narrowed from eighth plate cephalad to the first which is clearly narrower than the third; eighth and tenth plates nearly equal in width, much wider than the head, the latter being typically even a little narrower than third plate, widths of head and of first, third, eighth, tenth, and twelfth plates as 31: 29: 32: 41: 42: 39.

Head equal in length and width or only slightly wider (36: 35 or 34.5). Widest at marginal interruptions between which and the eyes the diameter is nearly uniform, the sides caudad of this convex and strongly converging; median portion of caudal margin straight. Rather strongly transversely furrowed or depressed immediately in front of caudal marginal thickening, the furrow extending entirely across the head and continuous with the caudal end of a wide longitudinal furrow on each side. A short transverse sulcus a little cephalad of and parallel with median part of frontal suture, a median longitudinal sulcus extending forward from this transverse one and showing or passing through a deeper pit-like depression at middle of length. Smooth and shining, or only very obscurely uneven.

Antennae very short, reaching only to the fifth or sixth body-segment; strongly attenuated. Composed of twenty-five or twenty-six articles of which the second is longest, those immediately following not abruptly shorter but only very gradually decreasing in size distad.

Ocelli ten to fourteen in number arranged in three or four series: *e. g.*, 1 + 3, 3, 3; 1 + 4, 4, 3; 1 + 3, 3, 2; 1 + 5, 4, 3, 1; 1 + 4, 3, 2, 1. The single ocellus much the largest, subvertically elliptic or oval.

Prosternum 1.5–1.55 times wider than long. Distance between chitinous spots near 2.23 times width at level of bottom of sinus; 3.35 times dental line. Teeth subequal, acute, with line of apices manifestly recurved. Median sinus wide and deep with its sides concave. Tubercle of spine well developed, contiguous with base of ectal tooth; spine slender and bristle-like, not much longer than the teeth.

First dorsal plate with sides moderately diverging cephalad; 1.8 times wider than long. Plates under lens appearing finely and in part only obscurely roughened, the roughening as usual more distinct caudad. Major plates excepting the seventh, showing distinctly the short transverse submarginal sulcus on each side, the seventh plate showing a similar sulcus near each caudal corner and one near each anterior corner as well. Most of the major plates marked with two distinct longitudinal furrows which diverge more or less from near the caudal margin cephalad, these furrows in some distinct only in front of the submarginal transverse marks. Posterior angles of eleventh and thirteenth plates a little produced, those of the others rounded or obliquely excised.

Most ventral plates with a rather deep longitudinal furrow toward each side but mesad of a weaker submarginal furrow. The usual median longitudinal furrow with also the transverse depression cephalad of caudal margin more or less evident.

Coxal pores small or moderate: 3, 4, 4, 3; 4, 5, 5, 5; 5, 5, 5, 5; 5, 5, 6, 4; 5, 5, 6, 5.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 2, 1}$; of the second, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 2, 1}$; of the third same as second to, $\frac{0, 0, 1, 2, 2}{0, 0, 2, 2, 1}$; of the fourth, $\frac{0, 0, 1, 2, 2}{0, 0, 1, 2, 1}$ or ventral spines 0, 0, 2, 2, 1; of fifth same as fourth or ventral spines may also be 0, 0, 2, 2, 2; of the sixth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 1}$ or ventral spines 0, 0, 2, 2, 2; of the seventh, $\frac{0, 0, 1, 2, 2}{0, 0, 2, 2, 2}$ or dorsal spines 0, 0, 2, 2, 2; of the eighth and ninth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$; of the tenth and eleventh, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$ or ventral spines 0, 0, 2, 3, 2; of the twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$ or ventral spines 0, 0, 2, 3, 2; of the thirteenth, $\frac{0, 0, 3, 2, 2}{0, 1, 2, 3, 2}$; of the penult, $\frac{0, 0, 3, 1, 1}{0, 1, 3, 3, 1}$ or ventral spines 0, 1, 3, 2, 1, claws 2; of the anal, $\frac{0, 0, 3, 1, 0}{0, 1, 3, 3, 1}$ or ventrad 0, 1, 3, 2, 1, claws two. None of the coxae armed either above or laterally.

Gonopods of male wide, truncate distad, flattened in an ectoventral dorsomesal direction; bearing a few short bristles in a row along distal edge of ventral side.

Claw of female gonopods long and moderately stout, considerably

curved, subacute but apex narrowly rounded. Spines 2 + 2, the outer clearly longer than the inner, acuminate from base. First article with inner side sharply defined and strongly chitinized edge; considerably curving ectad proximally. Median process of sternite long and acutely acuminate, strongly chitinized.

Length 10 to 14 mm. A male (type) 12.5 mm. long has antennae 5 mm. long and width of tenth plate 1.7 mm. The widths of head and of first, third, eighth, and tenth plates are to each other as 18: 17: 19: 24: 24.

TYPE.—M. C. Z., No. 604, Mississippi: Byram, July, 1910.

PARATYPES.—M. C. Z., No. 603, Mississippi: Byram, July, 1910.

GUAMBIUS (GUAMBIUS) EUTHUS (Chamberlin).

Lithobius euthus Chamberlin, Proc. Acad. nat. sci. Phil., 1904, p. 652.

DIAGNOSIS.—Dorsum brown, first and last plates more reddish; head darker reddish brown. Antennae short; articles twenty-five to twenty-eight. Ocelli about eight in three series. First dorsal plate 1.72 times wider than long. Posterior angles of eleventh and thirteenth dorsal plates produced weakly. Dorsal spines of anal legs, 0, 0, 3, 1, 0; ventral, 0, 1, 3, 3, 0 or 0, 1, 3, 2, 0; claws 2, the accessory one long. Dorsal spines of penult legs, 0, 0, 3, 1, 1; ventral, 0, 1, 3, 3, 2; claws three. Dorsal spines of thirteenth, 0, 0, 3, 2, 2; ventral, 0, 1, 3, 3, 2. Ventral spines of twelfth legs, 0, 0, 2, 3, 2. Dorsal spines of second legs, 0, 0, 2, 2, 1; ventral, 0, 0, 2, 3, 1. Dorsal spines of first legs, 0, 0, 2, 1, 1 or 0, 0, 2, 2, 1; ventral, 0, 0, 1, 1, 1 or 0, 0, 1, 2, 1. None of coxae armed. Length 12–15 mm.

DESCRIPTION.—Dorsum brown, the first and the last tergites darker and more reddish.

Head darker reddish brown or chestnut. Antennae brown or like head, paler distad. Prosternum and prehensors like head. Venter brown. Legs light brown.

Body distinctly narrowed cephalad to the first plate which is clearly narrower than the head and than the third plate. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 76: 69: 76: 82: 80: 77.

Head wider than long (43: 38.) Caudal margin straight or nearly so. Narrowed from breaks caudad; moderately widely rounded cephalad.

Antennae short; articles twenty-five to twenty-eight, moderate.

Ocelli near eight in three series: *e. g.*, 1 + 3, 3, 2, which is the commonest arrangement.

Prosternal teeth 2 + 2; the mesal one of each pair distinctly larger than the outer and the line of apices mostly a little procurved. Sinus typically between semicircular and U-shaped. Spine in usual position, stouter than the bristles, acute. Prosternum 1.45–1.5 times wider than long. Distance between chitinous spots 2+ times wider than width at level of bottom of sinus; 3 times the dental line.

First dorsal plate 1.72 times wider than long. Posterior angles of eleventh and thirteenth dorsal plates weakly produced but the processes varying considerably in distinctness and size.

Coxal pores small; mostly 4, 4, 4, 4; also 4, 5, 5, 4 and 5, 5, 5, 4, etc.

Spines of first legs, $\frac{0, 0, 2, 1, 1}{0, 0, 1, 1, 1}$ to $\frac{0, 0, 2, 2, 1}{0, 0, 1, 2, 1}$; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 1}$; of the third, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the fourth to twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the thirteenth, $\frac{0, 0, 3, 2(1), 2}{0, 1, 3, 3, 2}$; of the penult, $\frac{0, 0, 3, 1, 1}{0, 1, 3, 3, 2}$, claws three, of the anal, $\frac{0, 0, 3, 1, 0}{0, 1, 3, 3, 0}$ or ventral 0, 1, 3, 2, 0, claws two, the accessory being nearly as long as the principal one. None of the coxae at all armed.

Claw of female gonopods of usual type; long, acutely pointed, moderately curved, mesally hollowed out and rather thin. Spines 2 + 2, long and stout, acutely and evenly acuminate from very base; the inner spine shorter than the outer and also attached farther proximad so that the actual difference is exaggerated in appearance. First article with the mesal side strongly chitinized as usual, proximally bent ectad or appearing excavated.

Length 12–15 mm.

TYPE.—M. C. Z., No. 606, Texas: Austin, J. H. Comstock. The types are all females.

GUAMBIUS (GUAMBIUS) PINGUIS (Bollman).

Lithobius pinguis Bollman, Ent. Amer., 1888, 4, p. 7; Bull. 46, U. S. N. M., 1893, p. 79.

The original description, rearranged, is as follows:—

Dark chestnut-brown. Head and antennae dark. Legs paler. Slender; not smooth; sparsely pilose.

Head wider than long (3.5:3). [The ratio given, possibly including prehensors, is doubtless too great]. Polished, not pilose.

Antennae short. Articles twenty-two to twenty-four, short.

Ocelli four to six arranged in two or three series.

Prosternal teeth 2 + 2.

Posterior angles of all the dorsal plates straight.

Coxal pores 3, 3, 3, 2 to 4, 4, 4, 4, round.

Spines [ventral] of the first pair of legs, 0, 0, 1; of the penultimate pair 1, 3, 2, 1 to 1, 3, 3, 1; of the anal pair, 1, 3, 2, 0.

Posterior legs short.

Claw of female genitalia [gonopods] entire; stout and much curved. Spines strong, subequal.

Length of body 9-10 mm.

TYPE LOCALITY.—Arkansas: Little Rock (Bollman).

Based upon three female specimens.

A much rubbed specimen (M. C. Z., No. 602), referable with some doubt to this species, was secured by the writer at Hudsonville, Miss.

GUAMBIUS (SIBIBIUS) COLORADANUS (Chamberlin).

Plate 4, fig. 3-5; Plate 5, fig. 1.

Arenobius coloradanus Chamberlin, Ann. Ent. Soc. Amer., 1912, 5, p. 141.

DIAGNOSIS.—Testaceous to dark brown and dull chestnut; head of same color. Antennae short, articles thirty to thirty-five. Ocelli nine to twelve in three series. Anal legs of male rather slender but tibia more crassate. Penult legs with the usual crest (Plate 4, fig. 5). Dorsal spines of anal legs 1, 0, 3, 2, 1; claws two. Dorsal spines of penult legs 1(0), 0, 3, 2, 2 (♀) or 1(0), 0, 3, 2, 1 (♂). Ventral spines of thirteenth legs 0, 0, 3, 3, 2. Ventral spines of twelfth legs 0, 0, 3, 3, 2; of eleventh, 0, 0, 2, 3, 2. Dorsal spines of first legs 0, 0, 2, 1, 1; ventral, 0, 0, 1, 2, 1 or 0, 0, 1, 3, 1. Last pairs of coxae laterally armed. Length 12 to 15 mm.

DESCRIPTION.—Dorsum from testaceous to dark brown and dull chestnut with the posterior plates and the first one usually not at all darkened. Head mostly the same color as dorsum or very nearly so, or somewhat more reddish. Antennae concolorous with head, pale distad. Venter from yellow or testaceous to dark brown, the caudal plates usually a little darker. Prosternum and prehensorial feet of same color as head or nearly so. Legs of same color as adjacent portion of venter.

Head widest at level of marginal interruptions; clearly wider than long (11:10); caudal margin straight. Depressed or furrowed

parallel with frontal suture a little cephalad of the latter, from this furrow a median longitudinal furrow extending toward anterior margin. Two, usually clearly impressed, longitudinal furrows on caudal region of head, one a little each side of the middle and the two united in front of the posterior margin by a transverse furrow. Smooth and shining.

Antennae short or very short, reaching the sixth or seventh segment; articles thirty to thirty-five, the second very long with those more distad much shorter, cylindric, subuniform or, more usually, with longer articles occurring singly at intervals among the shorter ones, in general decreasing in size distad. Hairs of medium length.

Eyes composed mostly of from nine to twelve ocelli arranged in three series: *e. g.*, 1 + 3, 3, 2, 1 + 4, 3, 3, 1 + 4, 4, 3. The single ocellus much largest, subvertically elliptic or oval.

Dorsal plates all very finely or obscurely roughened, appearing smooth and shining to the naked eye; usually no furrows distinctly developed excepting the usual depression or furrow immediately within the caudal and lateral margins and on some the short transverse mark on each side near margin at about one third length of plate from caudal margin. Posterior angles of ninth, eleventh, and thirteenth dorsal plates strongly produced; posterior angles of other minor plates rounded or obliquely excised.

Ventral plates all punctate and finely roughened; impressed with three longitudinal furrows of which the median is most distinct, the latter on some of the more posterior plates ending caudad in a deeper pit or depression about one third the length of plate from caudal edge; mostly with a rather wide transverse depression or furrow caudad of middle of plate. Sometimes an additional longitudinal furrow showing on each side between the median and the lateral, the caudal end often curving mesad to unite with its mate at middle; this furrow often more or less united with the lateral one. The last several plates sometimes with furrows very obscure or practically absent.

Prosternum about 1.6 times wider than long. Teeth 2 + 2, small acute. Median incision wide and moderately deep, its sides concave. Spine on each side well ectad of outer tooth, much more slender than teeth but stouter at base than neighboring hairs, bristle-like distad.

Coxal pores circular, well separated; in number arranged as follows: — 3, 4, 4, 3; 3, 4, 4, 4; 4, 5, 5, 5.

Coxae of anal legs armed laterally and dorsally; other coxae seemingly unarmed. Spines of first legs, $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 1, 2, 1 \end{smallmatrix}$ or, $\begin{smallmatrix} 0, 0, 2, 1, 1 \\ 0, 0, 1, 3, 1 \end{smallmatrix}$; of the second

and third, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 1}$; of the fourth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 1}$ or, occasionally, $\frac{0, 0, 3, 2, 1}{0, 0, 2, 3, 1}$; of the fifth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 1}$; of the sixth to the eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the twelfth and thirteenth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$; of the penult, $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$, in the female, or, $\frac{0, 0, 3, 2, 1}{0, 1, 3, 3, 2}$ in the adult male, each having claw armed with two accessory claws; of anal, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 1}$, the dorsal spine of tibia and also outer one of femur readily lost so that spining may appear thus, $\frac{1, 0, 3, 2(1) 0}{0, 1, 3, 3, 1}$, two accessory claws present as in the penult pair. In the female the anal legs are short and very slender, decreasing gradually in diameter from the femur distad, the tibia being intermediate in diameter between femur and first tarsal article as the latter is between tibia and second tarsal article; tibia rather weakly longitudinally furrowed along dorsal surface. Penult legs similar to anal except for smaller size. In the male the anal legs are also rather slender but the tibia is crassate, being fully as thick as the femur and being widest at distal end and abruptly thicker than the first tarsal joint, its dorsal surface shallowly depressed, a longitudinal dorsal furrow also present on femur and prefemur, that of the latter less distinct. Penult legs of male also slender, with joints dorsally longitudinally furrowed; the tibia obliquely excised at dorsocaudal corner of distal end and bearing at this place a small, flattened lobe or crest which is transverse to the axis of the joint, this lobe bearing a few short hairs but nothing like the brush in *Arenobius manegitus*.

Gonopods of male relatively wide, flattened, truncate distad; bearing mostly 4-6 bristles in a transverse row along distal edge of ventral side.

Gonopods of female with claw entire, long and stout, acutely pointed, considerably curved, darkened distad. Basal spines 2 + 2, subequal or with the inner in some individuals considerably shorter, stout; in ventral view acutely conical in outline. Articles, especially the second and third, glabrous or nearly so on ventral and mesal surfaces, but clothed with a moderate number of bristles on ectal and dorsal surfaces.

Body rather slender being about 7.5 times as long as width of tenth plate; conspicuously attenuated cephalad from eighth plate, with the first plate much narrower than the third. Width of head, first, third, eighth, and tenth dorsal plates to each other as 40, 33, 37, 47 and 47, the eighth and tenth plates being equal and manifestly considerably wider than the head.

Length from 12 to 15 mm. A male 13 mm. has antennae 5 mm.

long and anal legs exclusive of coxa, *circa* 4.8 or 5 mm. long, with the tenth plate about 1.7 mm. wide.

TYPES.—M. C. Z., No. 599, Colorado: Manitou, August, 1910. Also taken at Durango, Colorado, C. F. Baker, 1894, (M. C. Z., No. 600).

GUAMBIUS (SIBIBIUS) OEDIPES (Bollman).

Plate 5, fig. 2, 3.

Lithobius oedipes Bollman, Ent. Amer., 1888, 4, p. 8.

DIAGNOSIS.—Brown to somewhat chestnut, the posterior plates sometimes with a median longitudinal dark stripe. Head darker than dorsum, chestnut. Antennae short; articles twenty-four to twenty-six. Ocelli nine to eleven in three series. Body but little more than six times longer than width of tenth plate. In male fourth article of anal legs very strongly crassate, with a conspicuous bunch of long hairs at distal end (Plate 5, fig. 2). Penult legs much more slender; fifth article with excision and crest (Plate 5, fig. 3). Dorsal spine of anal legs 0, 0, 3, 2, 1, claws three. Dorsal spines of penult legs 0, 0, 3, 2, 1 (♂) or 0, 0, 3, 2, 2 (♀). Ventral spines of thirteenth legs 0, 1, 2, 3, 2. Ventral spines of twelfth legs 0, 1, 2, 3, 2 or 0, 0, 2, 3, 2; of the eleventh 0, 0, 2, 3, 2. Dorsal spines of first legs 0, 0, 2, 1, 1; ventral, 0, 0, 2, 1, 1. None of the coxae armed.

Length 12.5 to 15.5 mm.

DESCRIPTION.—Dorsum brown to somewhat chestnut, the latter color especially affecting the first and the last few plates; the posterior plates may have a median longitudinal dark mark which may be either broad or narrow or with one or more longitudinal dark lines each side of the middle. Head darker than the dorsum, chestnut. Antennae chestnut, paler distad. Prosternum deep brown, the prehensors much paler. Venter testaceous to rather dark brown, the posteriorly darker and sometimes decidedly reddish from the middle of the body caudad, the darker area usually showing a pale median area. Legs brownish yellow to light brown, the posterior pairs darker proximally, but distally, especially distad of fourth article, light, bright yellow or orange.

Body proportionately broad, being only about 6.1 times longer than the width of the tenth plate. Widths of head and of first, third, eighth, tenth, and twelfth plates to each other as 47: 43: 50: 61: 64: 58.

Head considerably wider than long (47:42). Of usual shape. Surface punctate, only obscurely uneven.

Antennae short, composed of twenty-four (♀) or twenty-six (♂) articles which are short.

Ocelli nine to eleven, nearly uniformly in three longitudinal series or partially in four: 1 + 2, 3, 3; 1 + 3, 3, 2; 1 + 3, 4, 3; 1 + 1, 3, 3, 1. The single ocellus ovate. The first ocellus of top row usually conspicuously larger than other seriate ocelli.

Prosternum wider than long in about ratio 45:26, being thus about 1.7+ times wider than long. Distance between chitinous spots 2.26 times as great as width at level of mesal incision, 3.4 times as great as length of the dental line. Teeth 2 + 2, equal, moderately large, acute, and rather pale. Tubercle of spines well developed, situated immediately ectad of outer tooth; the spine rather stout but much more slender than the teeth.

All dorsal plates excepting the first finely roughened, the first being smooth and shining like the head. Posterior angles of ninth, eleventh and thirteenth acutely produced.

Median ventral furrow extending across entire plate in each case, broad and rather deep. Lateral ventral furrows less distinct. All ordinarily much weaker on posterior plates.

Coxal pores circular, moderate: *e. g.*, 5, 5, 5, 4-6, 5, 5, 4; 6(5) 5, 5, 5; 3, 5, 4, 3.

Spines of first legs, $\frac{0, 0, 2, 1, 1}{0, 0, 1, 2, 1}$; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 2}$; of the third and fourth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the fifth to eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the twelfth, $\frac{0, 0, 3, 2, 2}{0, 1, 2, 3, 2}$ or, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the thirteenth, $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$; of the fourteenth or penult, $\frac{0, 0, 3, 2, 1}{0, 1, 3, 3, 2}$ (♂) or, $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ (♀), the claws three, both accessory claws very distinct; of the anal, $\frac{0, 0, 3, 2, 1(2)}{0, 1, 3, 3, 1}$, claws three, the outer accessory very small and slender. No coxal spines could be detected in the types.

In the male the third article of the anal legs is clavately thickened and ridged along mesal or dorsomesal surface. Fourth article very strongly crassate; marked on dorsomesal surface with a broad deep longitudinal furrow which bends somewhat obliquely more ventrad from proximal to distal end; bordered along entire dorsal or ectal side by a very conspicuously elevated thin ridge, which near the beginning of its distal fourth, bears a brush of long hairs; this brush projects mesad; scattered similar hairs also occur on the edge more proximad; the furrow is also bordered on the mesal and more ventral side with a lower thin ridge which bears sparsely along its edge long hairs. Fifth article or tibia abruptly much more slender than the fourth (Plate 5, fig. 2).

Penult legs in the male with third and fourth articles much more slender than in the anal, the fifth not greatly more slender than the fourth. Fourth article but little enlarged, dorsally weakly longitudinally furrowed. Fifth article or tibia obliquely excised at distal end on mesal side and bearing toward dorsal edge of excised surface a thin keel-like triangular lobe or crest which is long in comparison with height, the highest end being distad, and projects mesad or dorsomesad. Crest not pilose.

Gonopods of male of usual shape, flattened and parallel-sided, bristles long.

Proximal articles of female gonopods strongly chitinous and conspicuously excavated mesally at base. Claw long and strongly curved, acutely pointed, entire. Spines 2 + 2, large and broad, flattened distad, the outer of about equal breadth to beginning of distal fourth where it narrows to a rounded point, the outer side of tip longer and more oblique than the inner. Inner spines set nearly at right angles to the outer, a little smaller.

In a male 15 mm. long the antennae are 5.5 mm. long and the anal legs 6 mm. The tenth plate is 2.34 mm. wide. A second male is 12.5 mm. long; and a female 15.5 mm. long.

LOCALITY.—Arkansas: Little Rock.

The description above is based upon the type specimens. Bollman gives the length of the male as 15.4 mm. and that of the female as 20 mm., but this is an error.

ARENOBIUS Chamberlin. (500)

Can. ent., 1912, 43, p. 177.

Head with marginal breaks present but small or incomplete.

Antennae short; articles normally twenty.

Eyes consisting of seriate ocelli; single ocellus enlarged.

Prosternal teeth 2 + 2, small. Spines very stout and tooth-like. No true median sinus present.

Posterior angles of ninth, eleventh, and thirteenth dorsal plates, produced.

Pores on only last four pairs of coxae; uniseriate.

Anal legs of male crassate; fourth and fifth articles dorsally, ectally and mesally longitudinally furrowed, the dorsal furrows of fifth article most conspicuous and in type limited by marginal pilose

ridges. Penult legs more strongly crassate; mesal furrow of tibia deep, conspicuously deepened and widened distally and in type embracing a lobe bearing a conspicuous brush of long hairs. Dorsal spines of anal legs in both male and female normally 1, 0, 3, 2, 1, occasionally only 1, 0, 3, 2, 0; ventral 0, 1, 3, 3, 1; claws two. Dorsal spines of penult legs in female 1, 0, 3, 2, 2, in male 1, 0, 3, 2, 1; ventral 0, 1, 3, 3, 2; claws three. Dorsal spines of eleventh to thirteenth legs 0, 0, 3, 2, 2. (Some of coxae armed laterally as well as dorsally).

Gonopods of male uniarticulate.

Gonopods of female with first article mesally strongly chitinized and excavated at base which is constricted, in the way usual in the family. Claw large. Spines 2 + 2.

TYPE.—*A. manegitus* (Chamberlin).

The only species of this genus as here restricted known to occur north of Mexico is the type form. The species is peculiar especially in the character of the prosternum and the nature of the modification of the penult legs in the male.

ARENObIUS MANEGITUS (Chamberlin).

Plate 6, fig. 3-6.

Lithobius manegitus Chamberlin, Ann. Ent. soc. Amer., 1911, 4, p. 43, pl. 4, fig. 4.

Arenobius manegitus Chamberlin, Can. ent., 1912, 43, p. 178.

DIAGNOSIS.—Dorsum testaceous to chestnut; head and usually first plate conspicuously darker, dark brown to deep mahogany. Antennae short; articles twenty to twenty-three. Ocelli ten to fifteen in three or four series. Body 6.65 to 6.75 times longer than width of tenth plate. Dorsal spines of anal legs 1, 0, 3, 2, 1 (♀♂); claws two. Dorsal spines penult legs 1, 0, 3, 2, 2 (♀) or 1, 0, 3, 2, 1 (♂). Ventral spines of thirteenth legs 0, 1, 3, 3, 2; of twelfth 0, 0, 3, 3, 2 or 0, 0, 2, 3, 2; of eleventh 0, 0, 2, 3, 2. Dorsal spines of first legs 0, 0, 1, 1, 1 or 0, 0, 2, 1, 1; ventral, 0, 0, 2, 1, 1 or 0, 0, 1, 2, 1. Last two pairs of coxae armed laterally. Anal legs of male crassate; fourth and fifth articles furrowed ectally, mesally and dorsally; ridges branching dorsal furrow of fifth densely pilose (Plate 6, fig. 5). Penult legs more strongly pilose; tibia modified (Plate 6, fig. 6). Length 15-17 mm.



Fig. 4. Distribution of *Arenobius*.

DESCRIPTION.—Dorsum testaceous to chestnut, nearly uniform, excepting for the first plate which is of same color as or but little paler than the head. Head conspicuously darker, varying from dark brown to deep mahogany, sometimes paler along the caudal border. Antennae of same color as head, becoming paler and more or less rufous distad. Venter from testaceous to rather dark brown, the caudal segments darker, often dull chestnut. Legs nearly of same color as adjacent portion of venter, the posterior pairs thus varying from dark brown to chestnut but always paler distally. Prosternum of almost same color as head, the prehensors somewhat paler and commonly of a more reddish tinge distad.

Body proportionately robust being only 6.66 to 6.75 times longer than width of tenth plate. Strongly narrowed cephalad from eighth segment to the first. Eighth and tenth plates equal in width and the first narrower than the third and equal in width to the head. Widths of head and of first, third, eighth, and tenth plates to each other as 55: 53: 55: 66: 66.

Marginal lateral breaks of head weak and but partially extending through margining. Sides of head caudad of breaks moderately convex and converging considerably to the rounded caudal corners; caudal margin a little incurved mesally. Head very nearly exactly equal in length and breadth; widest at level of breaks. Smooth or obscurely uneven, finely punctate, shining. Hairs sparse, moderately long. The most conspicuous mark is a sharply impressed median longitudinal sulcus running from anterior margin caudad to end abruptly a little in front of suture where it meets a weaker transverse furrow extending part way to each lateral margin.

Antennae short, reaching fifth to seventh segment. Composed normally of twenty articles of moderate length which decrease regularly and very gradually in size from the second distad to the penult. Articles sometimes as many as twenty-three.

Ocelli ten to fifteen in number, arranged in three or more frequently four series: *e. g.*, 1 + 3, 4, 3; 1 + 4, 3, 2; 1 + 4, 4, 3; 1 + 4, 3, 2, 1; 1 + 4, 4, 4, 1; 1 + 4, 4, 4, 2; 1 + 3, 3, 5, 3; 1 + 4, 4, 2, 2. Single ocellus large, somewhat cuneate with dorsal margin convex and apex ventrad, often indistinctly limited. Most caudal ocellus of the top series larger than the others sometimes more dorsal in position and often elongate as may also be some of the others. The first ocellus of second row also large. All ocelli deeply pigmented. Organ of Tömösvary cephalad of anterior end of second row, smaller in outline than the small ocelli.

Prosternum $1.7+$ times wider than long. Teeth $2 + 2$, very small, rounded, attached a little caudad of edge of prosternum on dorsal side. Spine a little mesad of each ectal angle and attached a little caudad of edge on ventral side; very stout, acutely conical, greatly exceeding in length and breadth the teeth. Anterior margin on each side straight, the two sides meeting in a very obtuse reentrant angle. Chitinous lines very distinct anteriorly but obscure below. (Plate 6, fig. 3).

Surface of first dorsal plate similar to that of head; smooth or but obscurely uneven and shining. Major plates depressed within lateral and caudal marginal rims, the depression on caudal plates more conspicuous and more furrow-like. Plates smooth and polished, no distinct furrows usually present.

On the ventral plates the most distinct mark is a median longitudinal sulcus which is longest and most distinct in the median and caudal regions, on the more caudal plates ending abruptly a little in front of the caudal margin. Lateral longitudinal furrows obscure, more often evident in anterior region of body, the plates mostly not distinctly depressed within the lateral borders. Obscurely roughened.

Coxal pores small, circular: mostly $\bar{5}, \bar{5}, \bar{5}, \bar{5}$, also $\bar{5}, \bar{4}, \bar{4}, \bar{4}$ and $\bar{5}, \bar{5}, \bar{5}, \bar{4}$. In one specimen $\bar{5}, \bar{5}, \bar{4}, \bar{3}$ on right side while $\bar{4}, \bar{5}, \bar{5}, \bar{5}$ on the left. Another with $\bar{5}, \bar{5}, \bar{5}, \bar{4}$ on left side and $\bar{5}, \bar{5}, \bar{5}, \bar{3}$ on right.

Spines of first legs mostly, $\frac{0, 0, 2, 1, 1}{0, 0, 2, 2, 1}$, but also, $\frac{0, 0, 2, 1, 1}{0, 0, 1, 2, 1}$ and, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 2, 1}$; of the second, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 2, 1}$ (observed in ♂) or, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 2, 2}$; of the third, the same or, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 3, 2}$; of the fourth and fifth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$ or, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$; of the sixth to eighth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 3, 2}$, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$, or, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$ or ventral spines $0, 0, 2, 3, 2$; of tenth and eleventh, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$; of the twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 3, 3, 2}$ (in ♀ and ♂) or, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 3, 2}$ (♂ chiefly); of the thirteenth, $\frac{0, 0, 3, 2, 2}{0, 1, 3, 3, 2}$; of the penult, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ (♀) or, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 2}$, claws three; of the anal, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 1}$ normally, but occasionally the dorsal spines vary to $1, 0, 3, 2, 0$ or even $1, 0, 3, 1, 0$, claws two, the accessory distinct. Last two pairs of coxae laterally armed.

In the males the anal legs are conspicuously thickened; the fourth and fifth joints being most strongly crassate, these distinctly furrowed longitudinally along dorsal, mesal, and ectal surfaces; the dorsal furrow of fifth joint especially deep and conspicuous, not entirely reaching distal end, distinct ridges bounding the furrow, these densely pilose, the hairs being longest where the ridges unite at distal end and there often forming a conspicuous bunch (Plate 6, fig. 5). The

fourth joint or prefemur typically with two longitudinal dorsal furrows, one toward mesal surface and one toward the ectal, the dorsal surface swollen and elevated between them. Penult legs of male more strongly swollen than the anal, the femur and tibia being especially strongly crassate, the tarsal joints abruptly more slender. A longitudinal furrow on ectal side of femur and tibia. Mesal surface of these articles also longitudinally furrowed, the furrow of the tibia conspicuously deepened at its distal end where it embraces a peculiar process bearing a brush of long hairs which projects mesad (Plate 6, fig. 6). Two dorsal longitudinal furrows on the femur, one toward mesal and one toward ectal surface with dorsal surface swollen and elevated between them, the prefemur similarly but less conspicuously modified.

Gonopods of male short but very broad with distal edge long and straight and well chitinized.

Claw of female gonopods long and very strongly curved, gradually narrowed to an acute point. Basal spines $2 + 2$, subequal or the outer a little longer; robust, cylindric proximally, the distal portion subconic in ventral outline, the apex frequently notched (Plate 6, fig. 4).

Length 15–17 mm. A male 15.5 mm. long has antennae 7 mm. long and anal leg nearly 5.8 mm. long with tenth plate 2.35 mm. wide.

Praematurus.—Dorsum testaceous or light brown, with sometimes a paler, yellow, median longitudinal line and also a less distinct line on each side. Head and first dorsal plate darker brown. Antennae like head but pale and somewhat rufous distad. Venter paler, more yellow, darker caudad. Legs similar ventrally, darker dorsally; the posterior pairs darker, light distally as in adults.

Antennae as in *maturus*.

Ocelli $1 + 3$, 4, 3. Single ocellus and first one of top row may be paler.

Prosternum as in adult excepting that hairs are fewer.

Coxal pores 4, 4, 4, 4.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 2, 1}$; of the sixth, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$; of seventh the same or, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$; others as in *maturus* (the lesser spining in each case, but ventral spines of twelfth 0, 0, 3, 3, 2).

Claw of female gonopods shorter and paler than in adult. Bristles of articles fewer. Basal spines $2 + 2$ but the inner one of each pair only about half the length of the outer one and much more slender, acute.

A female 13.5 mm. long has antennae 5 mm. long; anal leg near 4.5 mm. long; and eighth plate 1.75 mm. wide. (Unaka Springs, Tenn.).

Immaturus (Late).—Color nearly as in *praematurus*. Dorsum light brown or testaceous, the head darker brown or light chestnut. Antennae darkest over middle portion of length, palest distad. Venter and legs testaceous or yellowish. Posterior legs not much darkened, often pale throughout.

Articles of antennae twenty to twenty-three; those distad of the first four or five sometimes very short but with longer ones intermingled at intervals; in other cases of moderate length, decreasing gradually distad.

Ocelli 1 + 4, 2, 1, the anterior ocellus of top row, as usual, not directly in line. Also 1 + 4, 3, 3 with first and last of ventral row very small; and 1 + 3, 3, 2.

Prosternum as in older stages or very nearly so.

Coxal pores 3, 3, 3, 3 or 3, 3, 3, 2 (observed on one side only); most distal one of each series usually conspicuously larger than the others.

Spines of first legs, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 2, 1}$; of the third, $\frac{0, 0, 2, 2, 1}{0, 0, 2, 2, 2}$; of the sixth and seventh, $\frac{0, 0, 2, 2, 2}{0, 0, 2, 2, 2}$; of the eighth and ninth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$ (ventral once noted also as 0, 0, 1, 2, 2); of others as in adult excepting penult of male of which formula is, $\frac{1, 0, 3, 2, 2}{0, 1, 3, 3, 2}$ as in the female.

In the male the anal legs are a little more enlarged than in the female. Penult, if different, rather more slender than the anal with the characteristic furrows present, but as in the female. Characteristic pilose ridges bounding furrow on dorsal surface of fifth joint of anal legs in adult not present nor is the peculiar excavation and setigerous lobe of tibia of penult legs, this joint also at this stage bearing two dorsal spines at distal end.

Claw of female gonopods very short and subtriangular, moderately acute distad, pale yellowish throughout. Basal spines 1 + 1, small and acute, pale. Bristles few.

A female 11 mm. long has antennae 4.25 mm. long and anal leg 4 mm. long with tenth and eighth plates 1.6 mm. wide. (Unaka Springs, Tenn.).

Immaturus (Early).—Pale testaceous. Head brown with a paler band along the suture. Antennae brown, pale distad. Prosternum light brown, prehensors testaceous. Venter dilute yellow of a violaceous tinge, darker caudad. Legs all pale with the tarsi brighter; the caudal pairs not dark, scarcely differing from the others.

Antennae very short, already consisting of twenty articles of which those beyond the third are short and decrease to the ultimate which is long.

Ocelli 1 + 3, 2, 1. The first of top row about the same size as the single ocellus which is vertically elliptic or oval as in older stages.

Prosternum nearly same as in preceding stages.

Coxal pores 3, 2, 2, 2.

Spines of first legs, $\frac{0, 0, 0, 1, 1}{0, 0, 1, 1, 1}$; of the second, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 2, 1}$; of the third, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 2, 1}$ or dorsal spines 0, 0, 2, 2, 1; of the fourth, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 1}$; of the fifth to seventh either same as fourth or ventral spines 0, 0, 1, 2, 2; of the eighth to eleventh, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 2}$; of the twelfth, $\frac{0, 0, 3, 2, 2}{0, 0, 2, 2, 2}$; of the thirteenth, $\frac{0, 0, 3, 2, 2}{0, 1, 2, 2, 1}$; of the penult, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 3, 1}$; of the anal, $\frac{1, 0, 3, 2, 1}{0, 1, 3, 2, 0}$ to $\frac{1, 0, 3, 1, 0}{0, 1, 3, 2, 0}$.

Anal and penult legs of male already distinctly swollen but more or less uniformly so and the anal clearly more so than the penult. The lateral furrows present but none of the characteristic developments of the adult indicated.

Length (♂) 9.5 mm.; anal legs 3.5 mm.; antennae, also 3.5 mm.; width of eighth plate near 1.3 mm. (Unaka Springs, Tenn.).

Agentalis I.—Pale testaceous, of violaceous tinge in life. Head more brownish, paler along the suture. Antennae yellow distad. Legs all pale, the caudal pairs mostly lighter than the others and but little darker proximad.

The twenty articles of antennae already present. In the portion distad of a few longer proximal articles, very short ones occur at intervals among longer ones. Ultimate article long.

Ocelli 1 + 3, 3, the first ocellus of each of the two series large and equal to the single ocellus or nearly so.

Prosternum as in older stages, but spine relatively even stouter, it and teeth pale.

Posterior angles of ninth, eleventh, and thirteenth dorsal plates already produced.

Coxal pores 2, 1, 1, 1.

Anal glands still strongly developed with no trace of degeneration.

Spines of first legs, $\frac{0, 0, 0, 1, 1}{0, 0, 0, 0, 1}$; of the second, $\frac{0, 0, 1, 1, 1}{0, 0, 0, 1, 1}$; of the third, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 1, 1}$; of the fourth and fifth, $\frac{0, 0, 1, 2, 1}{0, 0, 1, 2, 1}$; or dorsal spines of the latter may be 0, 0, 1, 2, 2; of the sixth to ninth, $\frac{0, 0, 1, 2, 2}{0, 0, 1, 2, 1}$; of the tenth and eleventh, $\frac{0, 0, 2, 2, 2}{0, 0, 1, 2, 1}$; of the twelfth, $\frac{0, 0, 2, 1, 1}{0, 0, 1, 2, 1}$; of the thirteenth and penult, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$; of the anal, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 0}$. Trochanters as yet all glabrous and unspined.

Anal and penult legs in the male already much more crassate as well as longer than the preceding pairs but otherwise not showing adult peculiarities.

Length close to 7 mm.; antennae 3 mm.; anal leg (exclusive of coxa) near 2 mm.; width of eighth plate .9+ mm. (Unaka Springs, Tenn.).

Pullus IV (Larva quarta).—Pale, suffused with violaceous throughout; the dorsum cephalad testaceous, caudad pale yellow. Head light brown with a rather broad paler band along the suture. Antennae paler, yellowish distad. Venter yellow caudad, darker cephalad. Of the developed legs the posterior pairs are lightest.

Antennae composed of twenty articles. Very short articles occurring at intervals in groups between longer ones, the first three or four longer than the others as in later stages. Hairs more sparse.

Ocelli 1 + 2, 1. Single ocellus largest, the first of the upper row much larger than other seriate ocelli.

Prosternum as in older stages excepting for fewer bristles; teeth and spines paler.

A single pore on each coxa of twelfth pair of legs.

Anal glands conspicuous.

The last three pairs of legs appearing as slender buds, closely appressed, in which the portion distad of the coxa is unsegmented.

Spines of first legs either none at all or, $\frac{0, 0, 0, 0, 1}{0, 0, 0, 0, 0}$; of the second, $\frac{0, 0, 0, 0, 1}{0, 0, 0, 0, 1}$; of the third, $\frac{0, 0, 0, 1, 1}{0, 0, 0, 1, 1}$ (right) or dorsal 0, 0, 0, 0, 1 (left); of the fourth to seventh, $\frac{0, 0, 0, 1, 1}{0, 0, 0, 1, 1}$; of the eighth, $\frac{0, 0, 0, 1, 2}{0, 0, 0, 1, 1}$; of the ninth, $\frac{0, 0, 1, 1, 2}{0, 0, 0, 1, 1}$; of the tenth, $\frac{0, 0, 1, 1, 1}{0, 0, 1, 1, 1}$ (right) or dorsal 0, 0, 1, 1, 2 (left); of the eleventh and twelfth, $\frac{0, 0, 0, 0, 0}{0, 0, 1, 1, 1}$.

Length near 5.8 mm. (Unaka Springs, Tenn.).

TYPE.—M. C. Z., No. 596, North Carolina: Hot Springs.

PARATYPES.—North Carolina: Hot Springs, M. C. Z., No. 588; Catawba, M. C. Z., No. 597; Saluda, M. Z. C., No. 594; Linville Falls, M. C. Z., No. 591. Tennessee: Johnson City, M. C. Z., No. 590; Unaka Springs, M. C. Z., No. 593; Altapass, M. C. Z., No. 595.